

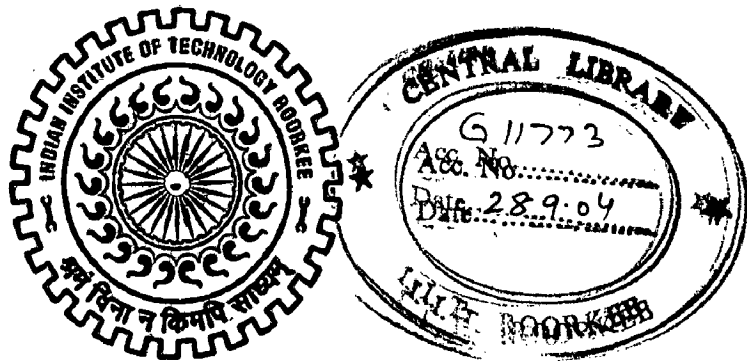
ANATOMY OF TRIBAL ARCHITECTURE OF ARAKU VALLEY

A DISSERTATION

*Submitted in partial fulfilment of the
requirements for the award of the degree
of*
MASTER OF ARCHITECTURE

By

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MAY, 2004

CANDIDATE'S DECLARATION

I hereby certify that the work, which is being presented in the dissertation, entitled "ANATOMY OF TRIBAL ARCHITECTURE OF ARAKU VALLEY" in partial fulfillment of the requirement for the award of the Degree of MASTER OF ARCHITECTURE submitted in the Department of Architecture & Planning of the Indian Institute of Technology, Roorkee is an authentic record of my own work carried out during the period from August 2003 to May 2004 under the supervision of Prof.(Mrs.) Rita Ahuja.

The matter embodied in this dissertation has not been submitted by me for the award of any other degree.

Place: Roorkee

Dated: 31st - May - 04.


(ANIL KUMAR.CHILAKAPATI)

CERTIFICATE

This is to certify that the above statement made by the candidate ANIL KUMAR. CHILAKAPATI is correct to the best of my knowledge.

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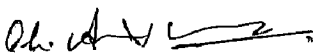
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Dated: 31st May -04.


(ANIL KUMAR. CHILAKAPATI)

“We must identify ourselves with the poor villagers, live as they live, help them to produce what we need and make full use of the local-material, local-talent and local-tools.”



-- M. K. Gandhi

Better villages for better world



LIST OF ABBREVIATIONS USED

ACDP	Assembly Constituency Development Programme
AP	Andhra Pradesh
ASTRA	Application of Science and Technologies in Rural Area
AVBC	Auroville Building Center
CBRI	Central Building Research Institute
CEC	Cost Effective Construction Technologies
CPRI	The Central Power Research Institute
DA	Development Alternatives
DRDA	District Rural Development Agency
IAY	Indira Awas Yojana
LBBC	Laurie Baker Building Center
NBO	National Buildings Organization
NIRD	National Institute of Rural Development
RPH	Rural Permanent Housing
SERC	Structural Engineering Research Center
VRO	Village Reconstruction Organization

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Anatomy of Tribal Architecture of Araku Valley



INTRODUCTION

I.1. INTRODUCTION

Today, in architecture, there are many branches of advanced development that have produced poor building resulting from a lack of understanding of the basic problems and from the superficial adoption of appropriate solution. From the alter of the past we should take the living fire and not the dead ashes. Let us remember the past, be alive to the present and create the future with courage in our hearts and faith in ourselves. While our knowledge of science, technology and psychology has increased, we have not applied new techniques and methods to buildings, nor have we substantially increased our understanding of the basic problems of shelter.

A house is not only ensemble of components, but also serves a social and family function. Its construction is always influenced by the climate, the character of the land, the local materials and the building techniques of the tribes in a given place. It expresses the individual in his socio-cultural embodiments. The basic characteristics of these houses are simplicity and integrity. Simplicity means the freedom from unnecessary mannerism and integrity means independence and honesty.

In any location there is a limit to the extent to which building forms are controlled by custom, and this limit generally imposed by surrounding physical conditions. The permanency of styles in Tribal vernacular Architecture is one of its most out standing characteristics.

I.1.2. PROBLEM IDENTIFICATION

At present, tribal architecture is disappearing owing to lack of conservation and the attitudes and the profound and radical transformation into modern life causing the neglect.

Tribal villages clearly show the importance of the careful choice of site and location, without a doubt, man's freedom is expressed in his ability to choose the place where he wishes to live. He who thinks least is inclined to consider only practical points, whereas he who thinks more deeply attempts to create beauty as well. Tribal villages have developed organically within economical and repetitive forms whose roots are similar to our own community structure.

Even in this stage, in our country, we are still ignorant of the origins and development of the humble architecture of our primitive villages. Let us not ignore what Brotagoras said “man is the measure of all things” though this study into tribal architecture, we can discover the basic roots of the development of community architecture and proceed with an enlarged vocabulary and clearer ideas which will help in planning and building of our own urban communities.

I.1.3. AIM

A total community isolated from urban influence and living styles of architecture offers a worthy example for an academic study. Man’s endeavor to protect him from environmental conditions and attach him to the traditions evolved by his forefathers gives an ideal opportunity to make an investigation into the beginning of shelter for a man. The man’s desire to express his artistic expression into a visual form renders the created shelter form as a spontaneous expression of man’s efforts to build and to create architecture. It is, therefore, the aim of this thesis to explore the nature of the rudimentary man within the rudimentary shelter and ultimately into a community environment.

I.1.4. OBJECTIVES

1. To analyze the existing physical shapes of the villages, dwellings, materials, traditions, faiths and accepted norms, living habits and work habits of the people. The interaction of people and physical environment.
2. To analyze the various forces(social, economic, cultural, political, technical, religious) and factors(living pattern, resources, knowledge) in the form of constraints and limitations and how they have molded their architecture.
3. To study their emerging pattern of “Basic Design Process”.
4. To explore the Possibilities of Appropriate Technological Innovations (Basic Infrastructure); suitable for the effective usage of in a Tribal Village.

I.1.5. SCOPE

The tribal people in India have been the object of occasional research and study for many decades – both before and after the advent of freedom.

A few have romanticized them by painting an idyllic picture of primitive and simplicity, a life of dance and song of ritual and color. Some others have looked upon them as a curious anthropological phenomenon.

There are several socio- economic studies on Indian tribes but the tribal architecture has not received attention.

This would be most useful not only for planners and architects but also to all those interested in history or engaged in academic pursuits of rudimentary and anonymous forms. The scope of research more explorative which invites more welcoming ideas which may pave the way clear for the researcher in this area.

The out put of this study could be: preserving the tribal architecture or “Girijan Vastukala” and also their social and cultural values. Preservation of such community may lay a variety of interesting hytregnty in the social groups and also their architecture. It may also help for Tribal Welfare Programmes; should be oriented towards retaining and enhancing their Art, Architecture and Culture taking into Considerations their attitudes and attributes.

I.1.6. APPROACH TO STUDY

Lewis Mumford points out that the *physical artifacts- the art objects-give maximum of meaning with the minimum of concrete material.*

This study which is an analysis of the anatomy of Girijan Vastu Kala, tries to comprehend the form of settlements and dwelling in the light of different factors such as location, climate, resources, construction techniques etc. keeping in mind the socio-cultural background of the Girijans.

This topic is not concerned with unique cases or with the multiplicity of examples: a few tribes of eastern Andhra Pradesh which have been selected for the study are typical in nature. The study restrict it self by not becoming involved in unnecessary details while analyzing the anatomy of Girijan Vastu Kala and trying to understand the forms of dwellings, settlements in the light of location, social aspects, climate, materials, construction techniques, and other variables.

1.2. DEFINITION OF TRIBES AND TERMINOLOGY

At the beginning of the 15th century, when the great age of discovery began, the whole of the western hemisphere and the vast area of the Pacific Ocean and the continent of Africa were unknown. Within three hundred years, however, the world as it is now known was largely discovered.

These expeditions and explorations led the Darwin inspired evolutionists of the 19th century to designate the inhabitants of these unexplored lands as primitive, since it was considered that their life patterns represented an earlier cultural phase through which the great civilizations of the world had progressed.

Claude Levi – Strauss (structural anthropology: 102) wrote “a primitive people is not a backward or retarded people; indeed it may possess, in one realm or another, a genius for invention or action that leaves the achievements of civilized peoples far behind.”

Paddington says that “a tribe is a group of people speaking common dialect, inhabiting a common dialect, inhabiting a common territory and displaying certain homogeneity in their culture”.

D.N. Majumdar says that a tribe is collection or group of families. He further says that a tribe is ordinarily an endogamous unit, the members of which confine their marriage within the tribes.

The definition of “Tribe” as it has emerged from attempts of scholars or tribal life is a social group usually within a definite area having a common dialect with cultural homogeneity, and unifying social organization. The term “Tribe” is also not defined in the constitution in the section concerning scheduled tribes and in fact there is no satisfactory definition anywhere. To the ordinary man the word suggests simple folk living in hills and forests; to an administrator it means a group of citizens who are the special responsibility of the president of India. The constitution has simply slated under art.342; “the president may with respect to any state or union territory, and where it is a state, after consultation with the Governor thereof, by public notification, specify the tribes or tribal communities, or parts of or groups within tribes, or tribal communities which shall for the purposes of this constitution be deemed to be scheduled tribes in relation to the state or union territory as the case may be....”

A "Tribe" is social group of people who have the following qualities:

1. A definite territory or who claim to occupy a common territory.
2. A common name
3. A common dialect
4. A common culture
5. Behavior of an endogamous group
6. Common taboos
7. Existence of distinctive social and political systems.
8. Full faith in their leaders,
9. Self – sufficiency in their distinct economy.

1.3. TRIBAL ARCHITECTURE IN GENERAL

Even before men and beasts walked on the earth, there existed some kind of architecture, coarsely modeled by the primeval forces of creation and occasionally polished by wind and rain into elegant structure. In the beginning once man the Nomad and Hunter began to overcome the problems entailed in his daily search for food, he sought shelter under nature's own protection, that is, in natural caves, may turn out to be man's last ones. And when his life became more sedentary and his main concern became that of creating a roof to shelter his indispensable living space. This was the rudimentary dwelling that was to become the most elemental expression of architecture.

There are many factors that relate this primitive architecture conceptually to each other; centuries of trade and conquest have diffused ideas and forms. However, the great common bond has the honest, intelligent, and natural way these primitive man solved their problem of shelter.

Tribal vernacular of different regions are made up of a wide distinct architectural types which have gradually evolved over the years from the appropriate continuation of local traditions and sensitivity towards local conditions.

The tribes built with local materials on selective protective sites or burrowed within the earth itself. A constant and organic development of primitive architecture has occurred in all parts of the world. Although, it is possible to isolate certain characteristics in relation to such natural conditions as climatic changes, earth

composition, and water resources, artificial political or racial boundaries have never distinguished the architectural character. It is entirely logical that men, although isolated from each other by bodies of water mountain ranges, would arrive at similar solutions to identical problems in many regions of the earth.

In a more specialized sense, the tribal, regional, or even village styles have certain basic components which consistently recur in representations of a particular type of design.

1.4. TRIBES OF INDIA

Tribal India is found in forests and in naturally isolated regions. Some areas like the plains of Ganga and the eastern coastal plain stretching from Benal to cape cam Orin in the south are densely populated, while the hills and jungles of Madhya Pradesh, Orissa, Bihar or Assam, Arunachal Pradesh, Manipur, Nagaland and Tripura in the North-East and Himachal Pradesh in the west do not carry the same burden of population on every square mile of land.

In these hilly and forested regions, live some distinctive tribes. Those who are 'backward' in their economy, which means that they can support fewer people per square mile of land by means of their indigenous productive system, and often at a comparatively lower standard of living than the neighboring communities who depend on specialized arts and crafts. Under the economic pressure of the latter, the tribal communities have often been forced into some kind of interdependence with their neighbours, where they have not actually been reduced to some form of subservience.

The Indian tribes are also known as : Vanyajati(caste of forest), Vanvasi(inhabitants of forest), Pahari(hill dwellers), Adamjati(original communities), Adivasi(first settlers), Janjati(Folk people), Anusuchit Janjati(Scheduled Tribe) and Girijan(Hill dwellers known in Andhra Pradesh). Among all these terms Adivasi is known most extensively, and Anusuchit Janjati (Scheduled tribes) is the constitutional name covering all of them.

Till today tribals have retained their customs and regulations; nearly all marry within their restricted local groups, and are sometimes guided by their own elders, or political chiefs in their internal and external affairs. It is these communities which have been designated as tribes and listed in a schedule for special treatment.

1.4.1. HISTORY

It is believed that the tribes were the earliest among the present inhabitants of the country. They can be classified into:-

1. The Astro--Asiatics in their primitive form are represented by the kols or the Mundas; the Khasis and Nicobarse;
2. The Mongoloid people speaking—dialects of the Sino-Tibetan family who are found largely among the sub-Himalayan regions and who are represented by the Nagas, the Bodos, the Kukichins etc.
3. The Dravidians--the Malers, the Oraons, the Gonds and the Khonds, who speak tongues of the Dravidian family, are scattered through the central Vindhya region and have covered the land of Deccan.
4. The Aryans--- are supposed to be the last to come to India. Thus, we see that the first three racial and cultural elements made a great contribution to the formation of the Indian people.

1.4.2. DEMOGRAPHIC ASPECTS OF THE TRIBALS

There are altogether 427 tribal communities (Roy Burman, B.K; A preliminary appraisal of the scheduled Tribes of India, New Delhi, office of the Registrar General India) all over India, the anthropological Survey has estimated the number at 314 considering a number of tribes to be the constituents of a group of tribes designated by a common name such as the Gonds, the Bhils etc.

According to the 1991 census they had a strength of 6,77,58,80 which was 8.08 percent of the total population.

MALE

FEMALE

Rural

Urban

Rural

Urban

31755930

2607341

30995096

2400013

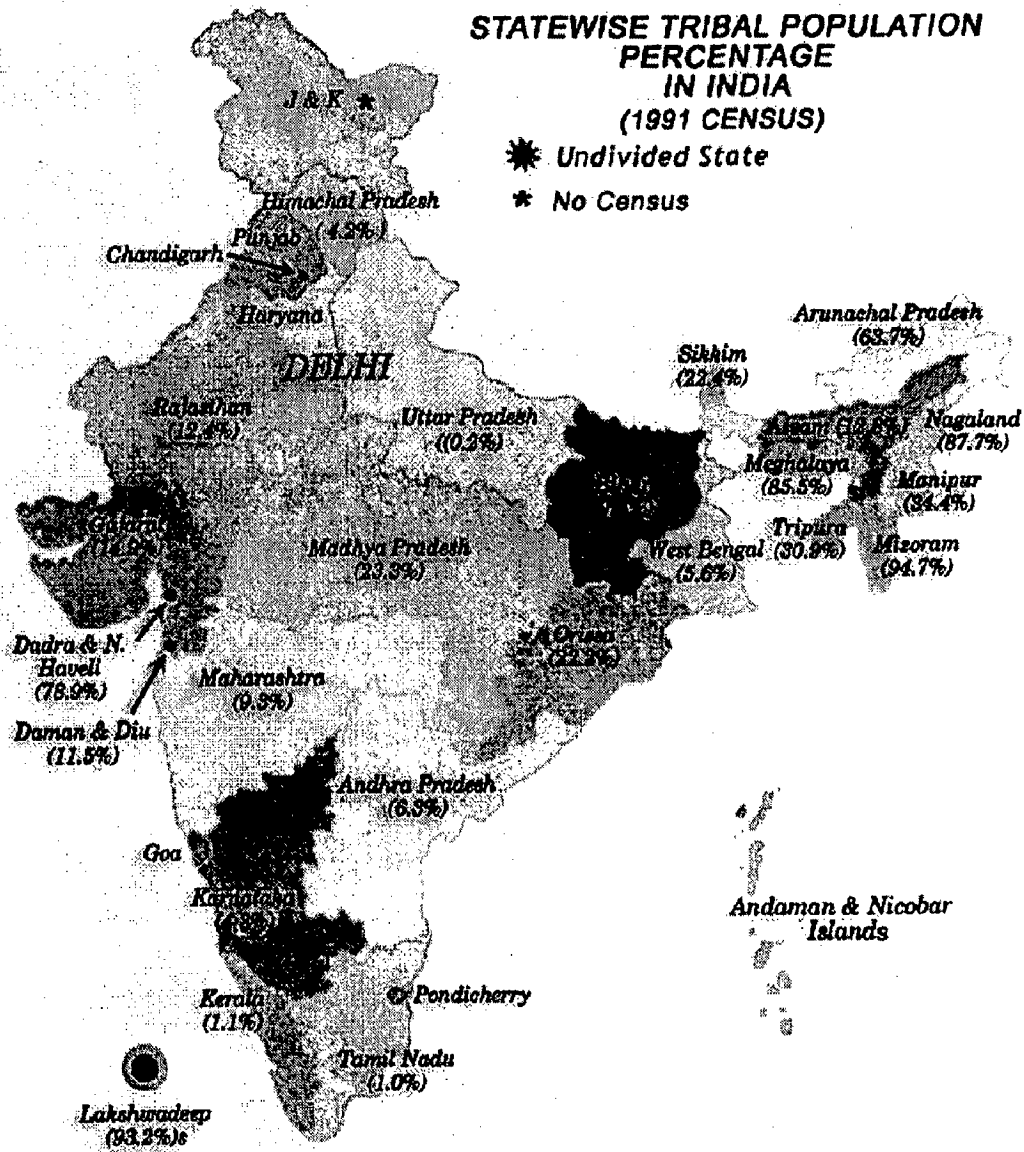


Fig: 1.1. State wise Tribal Population Percentage in India.

1.5. PROFILE OF ANDHRAPRADESH

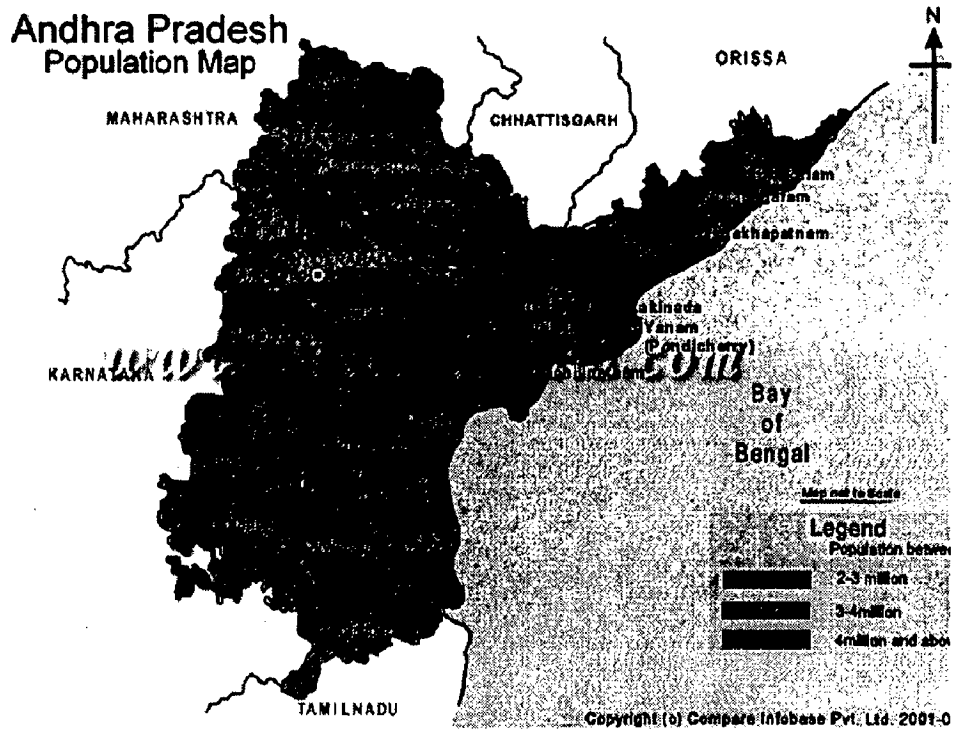


Fig: 1.2. Map of Andhra Pradesh

1.5.1. FACTS & FIGURES

Area	: 2,75,068 sq km
Population	: 73,433,000
Religion	: Hinduism (89.13%), Islam (8.90%), Christianity (1.82%), Others (0.15%)
Annual Rainfall	: 400 mm to 2,500 mm
Maximum Temperature	: 40°C
Minimum Temperature	: 13°C
Capital	: Hyderabad
Languages	: Telugu, Urdu

Literacy Rate	: 45%
Urbanization Ratio	: 26.89%
Per Capita Income	: 10,590 (at current prices in 1997-98)

1.5.2. INTRODUCTION

The state of Andhra Pradesh is recognized variously-for its legendary dynasties; for its most revered temple, Tirupati; for its beautiful language, Telugu; for its lacquer toys and beautiful weaves; rich literature and the vibrant Kuchipudi. Andhra Pradesh has often been called the “food bowl of the south.” There are ruins, palaces, museums, and ports apart from the sacred Tirupati, where one can leave one’s prayers to be answered

1.5.3. GEOGRAPHICAL INFORMATION

(a). Location

Located in south India, Andhra Pradesh is bounded by Tamil Nadu in the south, Maharashtra in the north and northwest, Madhya Pradesh and Orissa in the northeast, Karnataka in the west, and by the Bay of Bengal in the east. It is situated on the Deccan plateau and is one of the oldest geological formations of the country.

(b). Physical Features

Both in terms of area, as well as population, Andhra Pradesh is the fifth largest state in the country. The Godavari and Krishna rivers cut through the state, forming large deltas before joining the Bay of Bengal. The Tungabhadra, an important tributary of the Krishna, is yet another important river of the state.

The state can be divided into three important regions-the coastal region, comprising of nine districts, generally called **Andhra**; the interior region, consisting of four districts collectively known as **Rayalseema**; and the **Telengana** region, consisting of the capital Hyderabad and nine adjoining districts.

(c). Climate

The climate is generally hot and humid. The summer temperatures vary from 20°C to 40°C, while in winter it is between 13°C and 32°C. The southwest monsoons play a major role in determining the climate of the state. The northeast monsoons are responsible for about one-third of the total rainfall in Andhra Pradesh

(d). Flora and Fauna

Andhra Pradesh has a wide variety of wildlife and natural beauty. As one travels in the state, one can find diverse landscapes-from a lush coastal area to a dry deciduous forest to a mangrove belt. The state is home to India's largest tiger reserve, in the Nallamai forest. The Godavari river delta is famous for reptiles like the salt-water crocodile, fishing cats and other exotic animals. India's largest pelican refuge at Kolleru Lake, which is also a haven for migrating birds, is an important tourist site.

(e). History

The earliest mention of the Andhras appears in the Aitareya Brahmana (800 BC). It was called Dakshina Padh during those days. Andhras, Pulindas, Sabaras, and many other sects lived in Dakshina Padh. In the Mauryan age, the Andhras were a political power in the Deccan. Megasthenes, who visited the court of Chandragupta Maurya (322-297 BC), mentioned that the Andhra country had 30 fortified towns and an army of 1,00,000 infantry, 2,000 cavalry and 1,000 elephants. The Buddhist religious books reveal that Andhras established their kingdoms on the Godavari belt at that time. Even Ashoka referred in his 13th rock edict that the Andhras were his subordinates.

The flourishing Satvahana Empire, which followed the Mauryas, covered the entire Deccan plateau by the 1st century AD. From the seventh to the 10th centuries, the Chalukyas ruled the state. This was followed by the rule of the Cholas, Kakatiyas, and the powerful Vijayanagar Empire. By the 16th century AD, the Qutab Shahi dynasty established its firm foothold in and around Hyderabad. The Nizams, as the rulers of Hyderabad were called, maintained their rule, even during the advent of the French and British. Andhra Pradesh was constituted as a separate state on October 1, 1953, comprising the 11 districts of the erstwhile Madras state, and made Kurnool the

capital. By November 1, 1956, the Nizam's state of Hyderabad was amalgamated to the state of Andhra Pradesh.

(f). Ethnicity

The Andhras were originally believed to be Dravidians. However, some theories suggest that they were Aryans by origin who moved south of the Vindhyas, and eventually mixed with the non-Aryans. The Banjaras (or gypsies), the Gonds, the Sarvas, the Bagatas, the Mandulas, the Yenadis, the Chenchus, the Gadabas and the Mathuris are the well-known tribes of the state. Professionally they are food-gatherers, hunters, small farmers and nomads. One can find people of different faiths here-Hindus, Muslims, Buddhists and Christians. The principal language is Telugu, although Urdu is also spoken in and around Hyderabad.

(g). Arts and Crafts

Due to its diversified socio-cultural and religious influences, the handicrafts of Andhra Pradesh prospered around the temples, courts, villages and tribal communities. **Bidri** is a metal craft of Andhra Pradesh. It derives its name from Bidar, the hometown of this exquisite craft and the basic material used is alloy of zinc, oxidized and intricately inlaid with silver. **Nirmal** is a famous art that can be traced back to the Kakatiyas. Decorative, beautifully painted wooden articles like furniture, bowls, lamps, ashtrays, and boxes are typical items of Nirmalware. **Himroo** is a distinctive, luxurious fabric, once used as dress material by the nobles, with a cotton base and silk or art silk weave, made into stoles, gowns and furnishings. The colorful **leather puppets** or **Tholubommalu**, made from buffalo hide, bleached and tinted with local paints are famous in Andhra Pradesh. The most popular figures are the heroes and villains from mythology. The artisans of Hyderabad have perfected the art of creating articles of jewelry from the days of the Golconda kingdom. Hyderabad today is the largest **pearl center** of India. Andhra Pradesh has an age-old tradition of hand-woven **fabrics**. Silk and cotton saris from Pochampalli, Venkatagiri, Siddipet, Gadwal, Uppada, Narayanpet and Dharmavaram are household names throughout India. Other interesting crafts are the silver filigree work in Karimnagar, gold covering work on alloy or copper, silver, brass and gold from Machilipatnam, beads

and bangles from Kalahasti, in the Chittor district, and silver snake chains from Hyderabad. The Chari woodwork is also famous, especially in the Warangal district.

(h). Music and Dance

“Kuchipudi” is Andhra Pradesh’s most outstanding contribution towards the enrichment of the Indian culture. It began in the dance-drama form dating back to the 15th century. Its birthplace was Kuchipudi village near the Krishna River. A fine combination of *Natya*, *Nritta*, and *Nritya*, Kuchipudi was never a solo affair and required a number of actors. Men and boys, who received vigorous training in abhinaya, music, dancing, and singing, presented it in the open air on a stage. Kuchipudi has also recently evolved into a solo dance style. The solo dances are characterized by a rich expression, fast rhythms, swinging knee movements and circular movement of the arms. Inhabited by many large tribes, Andhra Pradesh presents a rich wealth of traditional folk and tribal dances. **Bathakamma**, **Gobbi**, **Mathuri**, **Dhamal**, **Dandaria**, **Dappu**, and **Vadhyam** are a few famous tribal dances. The dances of the Banjaras and the Siddi tribes are also famous. Other dance forms of Andhra Pradesh include **Veeranatyam**, **Butta Bommalu**, **Chindu Bhagawatam**, **Tappeta Gullu**, **Lambadi**, **Bonalu**, and **Dhimsa**. 'Tholubommalata', a shadow puppetry theatre is a fascinating folk art.

(i). Fairs and Festivals

Hindu festivals such as Dussehra, Deepavali, Sri Ram Navami, Krishna Janmashtami, Vinayaka Chavithi or Ganesh Chaturthi and Maha Shivratri are celebrated in the state. Similarly, Muslim festivals such as Bakr Id and Id-ul-Fitr and Christian festivals like Christmas, Easter and New Year's Day are also celebrated with gaiety. However, the celebrations of **Ugadi** (Telugu New Year's day in March-April) and **Sankranti** (in January) are unique in the state. **Bathakamma** is special to the Telengana region. In the month-long festival, Goddess Bathakamma’s idol is worshipped and is made to float on the rivers and lakes.

1.6. TRIBES OF ANDHRAPRADESH

1.6.1. MAJOR TRIBAL GROUPS

- The Lambadies (Banjaras),
- The Koyas,
- The Yenadis,
- The Chenchus,
- The Yerukalas and the Hill Tribes.

The Andhras are originally believed to be Dravidians. However, some theories suggest that they were Aryans by origin, who moved south of the Vindhyas, and eventually mixed with the non-Aryans. Andhra Pradesh is home of a diverse range of tribes present in large numbers. The Lambadies ('Banjaras'), the 'Koyas', the 'Bagatas', the 'Yenadis', the 'Chenchus', the 'Gadabas' and the 'Yerukalas' are the well-known tribes of the state.

(a). The Simple & Sober Lifestyle

The most striking feature of tribal life is their simplicity. Their demands are few; the forest is able to provide them with everything. Professionally they are food gatherers, hunters, small farmers and nomads.

The tribal worship nature. Each tribe has its totem. It may be a tree or animal. The object of worship could simply be a wooden pole or a stone or a group of stones arranged in a circle. Music, dance and craft are important pastimes. Crafts involve making of useful items like basket weaving or making terracotta pots.

Inhabited by many large tribes, Andhra Pradesh presents a rich wealth of traditional folk and tribal dances. 'Dhimsa', 'Lambadi', 'Bathakamma', 'Mathuri', 'Dhamal', 'Dappu' are a few famous tribal dances. Liquor, fermented toddy juice or fermented rice or garlands made from the flowers of the 'Mohua' tree are offered to everyone visiting a family in the tribal village. It is considered offensive to refuse it. During every ritual and festival liquor flows like water.

(b). **The Koyas:** The Koyas are supposed to have migrated from Bastar in Madhya Pradesh and form the bulk of the aboriginal population of Adilabad,

Warangal, East Godavari and Krishna districts. They are nomadic by nature and practice shifting cultivation. They are divided into two sections, the Langadaris and the Gonus. The Koyas of East Godavari districts are well built.

(c). **The Lambadies (Banjaras):** Also known as 'Sugalis', Lambadies are found in Rayalaseema, Warangal and Mahaboobnagar districts. They collect firewood and other minor products from the forest and sell it in towns and villages. It is said that formerly they worked as carriers, transporting goods and merchandise on bullock Backs, but they have now taken to cultivation.

(d). **Hill Tribes:** The hill tribes live mostly in the agency areas. They have many castes, and some of them apparently have come over from the Orissa side of the frontier, because their language is Oriya. The 'Mokadorlu', however, are distinct from the rest. So are the 'Bhagatas' and 'Ranas' who wear the sacred thread. So also are the 'Jatapus' and the 'Jatapu Doras'.

The 'Parojas' are the most numerous among the Oriya speaking tribes. There are seven different types of them. The 'Gadabas' are palanquin-bearers as well as cultivators. The 'Savaras' are divided into 'primitive' who live in the hill areas of 'Gunupur' in Orissa, and the 'civilised' ones who inhabit the Palakonda hills in Srikakulam district.

Their chief centre of habitation is the 6,000 square miles of mountainous territory in the East Godavari and Vishakhapatnam districts. About 20 tribes live in them speaking Dravidian and 'Mudari' dialects. Leading a primitive, and in many ways precarious existence, they are a happy-go-lucky folk, picturesque in their costumes, and greatly addicted to dance and music.

'Savaras' are the most notable among them. Their homes are the lofty hills and deep mountain valleys. They are ingenious people who have built bunds on mountain streams to water their fields, and even their villages show systematic designs. The huts are in parallel rows indicating their sense of orderliness.

(e). **The Chenchus:** The Chenchus live in the Nallamalai hills of Kurnool district. They are very peaceful and inoffensive people who acquire a livelihood on roots, wild game and fish, and only occasionally cultivate millets in small patches of fields. This tribe is badly off, and unless they take to full time cultivation there is no

hope for them. And yet, it is difficult to wean them from their habit of wandering off into jungles in search of minor forest produce such as honey, wild berries and tubers that they sell in the villages and towns in an effort to eke out a livelihood.

The popular legend is that when Lord Narayana took on Narasimhavatara, the Goddess Lakshmi was born in the Chenchu tribe, and both were living here happily. This love of Lord Narasimha with Goddess Lakshmi as 'Chencheta', a Chenchu bride, is famous in many folk songs of the place.

(f). The Yenadis: Considered partly tribal, their origin is obscure. Their men are tall, dark, lanky, their muscles soft and flabby, and their cheekbones prominent. They are good 'shikaris' (hunters) and specialise in trapping hares, rats, cobras and leopards.

(g). The Yerukalas: The Yerukalas are semi-tribal people who had been reluctantly granted status as 'Shudras'. They are basket weavers who often live in separate villages and speak a dialect different from that of Telugu.

1.7. COMMON VILLAGE PROFILE OF VISAKHAPATNAM

(a). Village Profile

Villages are spreader according to community base and forward communities are staying in main village that include village temple or village diet, primary school and also pond, and lower communities are staying little far and they have their own pond and fields.

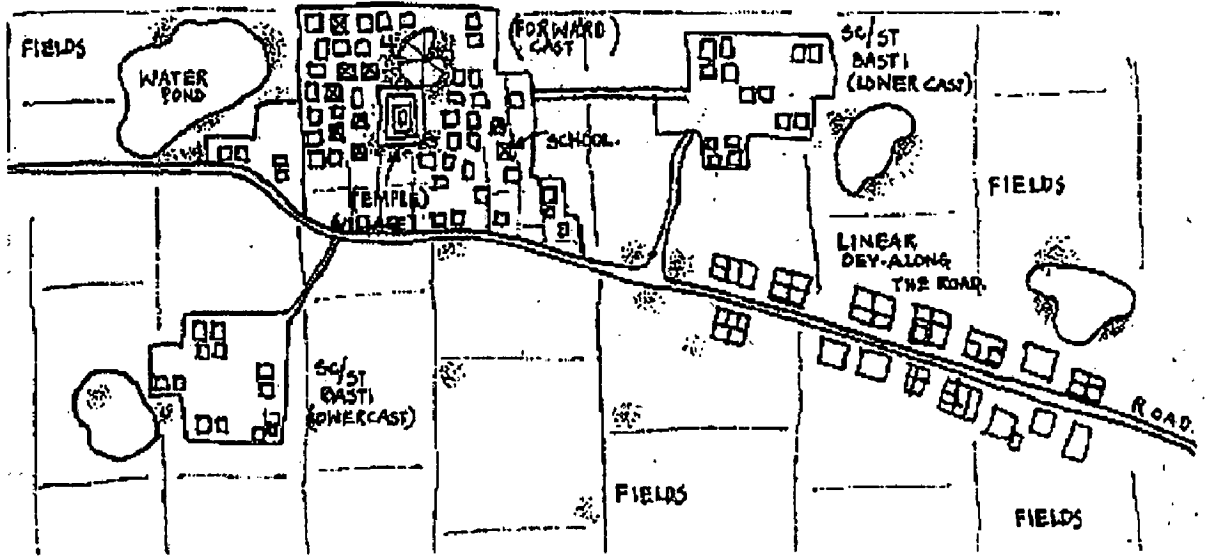


Fig: 1.3. Common Village Profile

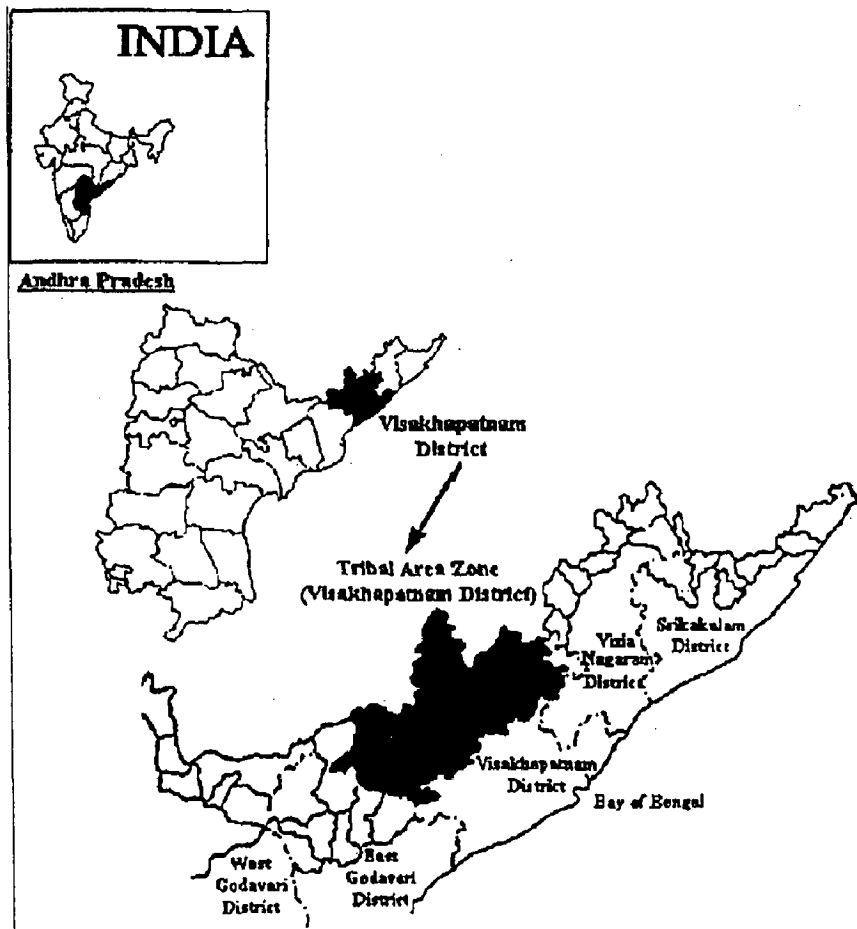
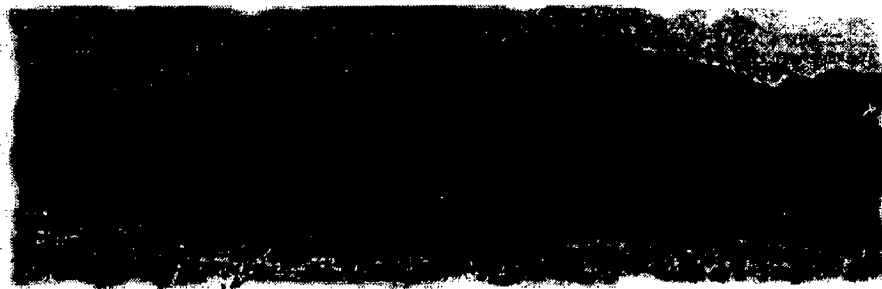


Fig: 1.4. Tribal zone in Visakhapatnam

Visakhapatnam district is spread over an area of 13,799km, with a population of 36.05 lakhs covered by 44 Panchayat samities. Of this, the agency area is 6,167 sq.km with a population of four and half lack (approx) spread over ten tribal development Panchayat Sammities.(Ref: tribal museum, Araku.).

1.8. GIRIJANS OF ARAKU VALLEY.



A R A K U V A L L E Y

1.8.2. A TRIBAL GLORE

Tribes inhabit the entire area and there are around 19 tribes. Tribal people who abound with their own folklore and traditions enhance the beauty of this valley. Tribal lifestyle expresses itself in various artistic creations like folk costumes and art literally differing from tribe to tribe. "*Dhimsa dance*" is a unique feature of the tribes of Araku Valley.

The beautiful Araku Valley, with its bracing climate, orchards and the Anantagiri Ghats, which present an enchanting view to the visitors, is attracting tourists not only from all parts of India but also from abroad as there are good communication and halting facilities.

1.8.3. TRIBAL COMMUNITIES IN ARAKU VALLEY

- BAGATA
- DOLIA
- GOUDU

- KHOND
- GADABA
- KONDA DORA
- KOTIA
- KUMMARA
- MALI
- MULIA
- MANNE DORA
- MUKHA DORA
- PORJA
- VALMIKI
- GASI
- RANA
- RENA.

1.8.4. FORESTS AND TRIBES

The forest clad mountains are the original habitats of the various Tribal Groups where for a long period in their History.

They have lived in ISOLATION but not without HARMONY WITH NATURE. They draw their sustenance largely from the forest. They had symbolic relationship with forest which continues undisturbed in the interiors even today. The tribes believe that their ancestors take abode in forest and they consider Hills and Forests also as their sacred complexes. The Forests and Hills form part of Tribal life, cultural and economy.

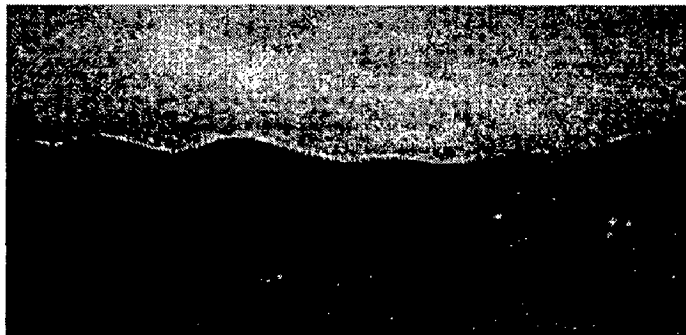


Fig: 1.5. Valleys of Araku

1.8.5. DIALECT

The people of these Tribes speak "KUI" language which belongs to the Dravidian linguistic group. Mr. G.A. GRIERSON observed that the Khondas or Khonds are "Dravidian Tribe" in these hills of Orissa and neighboring districts and are commonly called as KHONDS in Visakhapatnam, Srikakulam and Vizianagaram districts men and women speak Telugu also.

1.8.6. SOCIAL HIERARCHY

The Bhagatas said to be a soldier caste and considered to be of higher caste, at one time loyally served the king of Golconda. They have good social position, they are devote Hindus. Some of them being Vaishnavities and others Saivites, and it is rather difficult to see why they are classified as a tribe. They look on themselves as the leaders of the communities in this area and the leading Muttadar(village head) is normally a Bhagata.

The Konda Doras are also known as Konda Kapus and have been described as the 'agrestic slaves' of the Bhagatas. They claim to be Hindus but they have no objection to beef eating. They are not, however, regarded as untouchables.

The Bhagatas had the Kotiyas in Araku valley occupy a higher rank when compared with Khonda Dora. Pork is a taboo for the Kotiyas of this region whereas the Khonda Dora eats pork. But a Kotiya leader in a multi tribal village doesnot allow Khonda Doras to rear pigs in his village though the latter has an inclination to do so. Thus sometimes the 'dominant tribe' in a village may not allow the rearing of certain animals which are taboo though the other tribes prefer to do it with the objective of supplementing their food resources and improving their economic lot.

TRIBAL DRESS

The Tribal man usually wears a waist string and a small piece of cloth locally "gochi" as underwear. The ends are left loose and passed between the legs to cover the nakedness. They also wear a shirt, made of coarse cloth bought at weekly shandy. A few of these tribals also wear the headgear, locally known as "burrachuttu" which does not convey any social significance. During winter season, everyone covers himself with "patchadam" (thick coarse cotton blanket). They usually prefer hand-woven and coarse cloth as it is not only cheap but also very durable. They purchase the clothes from the weekly shandy at Araku on Friday and at Sunkarametta on Sunday.

Tribal women's saree is tied round the waist in such a way that it covers completely the upper and lower positions of the body upto a little below the knees, making a convenient to work both in the farm and in the forest as she participates equally along with the man to earn the feed. They prefer lowcost white sarees with coloured border. They do not wear choli. Ornaments are made of brass and aluminum, besides they wear necklaces of multi-colored glass beads. The hair style of the woman is known as "mula".



Fig: 1.6. Tribe Couple

The valmikis, most of whom are Hindus except for a few, converted christians, are regarded as untouchables. But however in their daily life in the village they have no restrictions in their interaction with other villagers. The Valmikis are not aboriginal inhabitants in this area but have migrated from plains.

1.8.7. OCCUPATION

The main occupation of these tribes is agriculture. They practice a primitive type of shifting cultivation which is known as 'Podu' cultivation. The tribal agriculturist clears a natural forest, sets fire to cut material, hoes the area with some primitive tools and broadcasts seeds of agricultural crops during rains. Due to high fertility status in the soil he harvests a fairly good crop in the first year, but gradually the yield during the succeeding years falls down. The tribes then turn his eye towards a fresh area. PODU cultivation has become a habit, and a part of the tribal's life. The tribals consider PODU as their birthright. Since generations, PODU is being practiced in these hills, and their values and moral standards are determined by 'Podu'*(D.R. Rao, D.V. Raghava: Social Factors Affecting Agricultural Devp.) and the cultivation of maize according to them, who ever grows it, is a good man and a moral man.

A tribal looks at his economic activity as a way of worshipping Gods and a way of life rather than a way of purely earning a living. The tribal believes that only those crops traditionally cultivated by them are fit for offering to the Deities. As such tribes prefer to grow only traditional crops and hesitate to plant cash crops.

Additional occupations are rare. They cultivate either their own land work as labourers in others land. After the recent land distribution effort of the state govt. by allotting excess land and unused land to the landless, most of the house-holds now have some cultivable land of their own.

Service animals and cattle are commonly found within almost every other household, though the number varies widely depending on economic conditions.

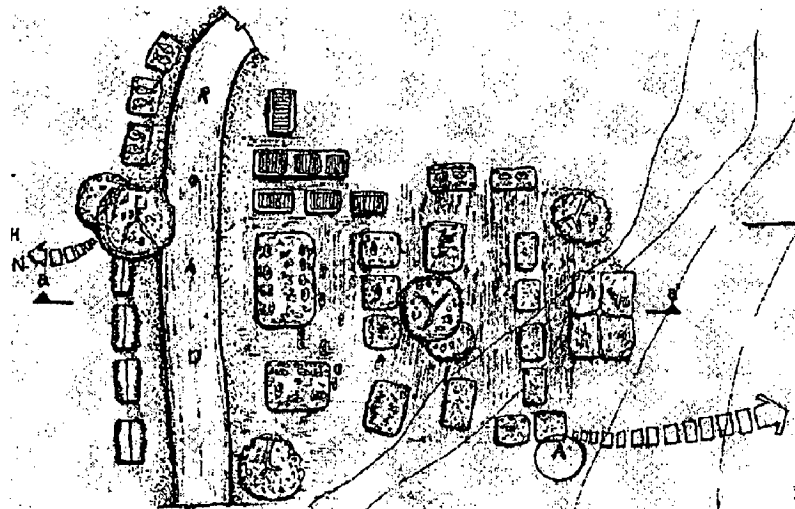
1.8.8. ECONOMIC BACKGROUND

It is not possible to assess the income of these people, due to the uncertain nature of income, ignorance, and reluctance of the people to disclose their actual income. The cereal produced from cultivation is in almost all cases insufficient, sometime even for domestic consumption and so is not sold in the market.

But, the majority of the tribal population depend upon the collection and sale of minor forest produce to the Girijan Cooperative Corporation Ltd.(helps tribes by providing more settled type of cultivation and wage based employment through the year), besides agriculture which is mostly dependent on rains.

THE WEEKLY MARKET PLACE MARKET-SANTA-SHANDI-HAAT

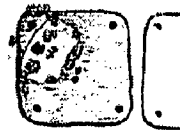
A large tree
Generally
becomes
landmark in
market place -
under the canopy
of which
transactions goes
on



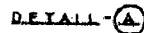
Section AA'



ELEVATION



PLAN



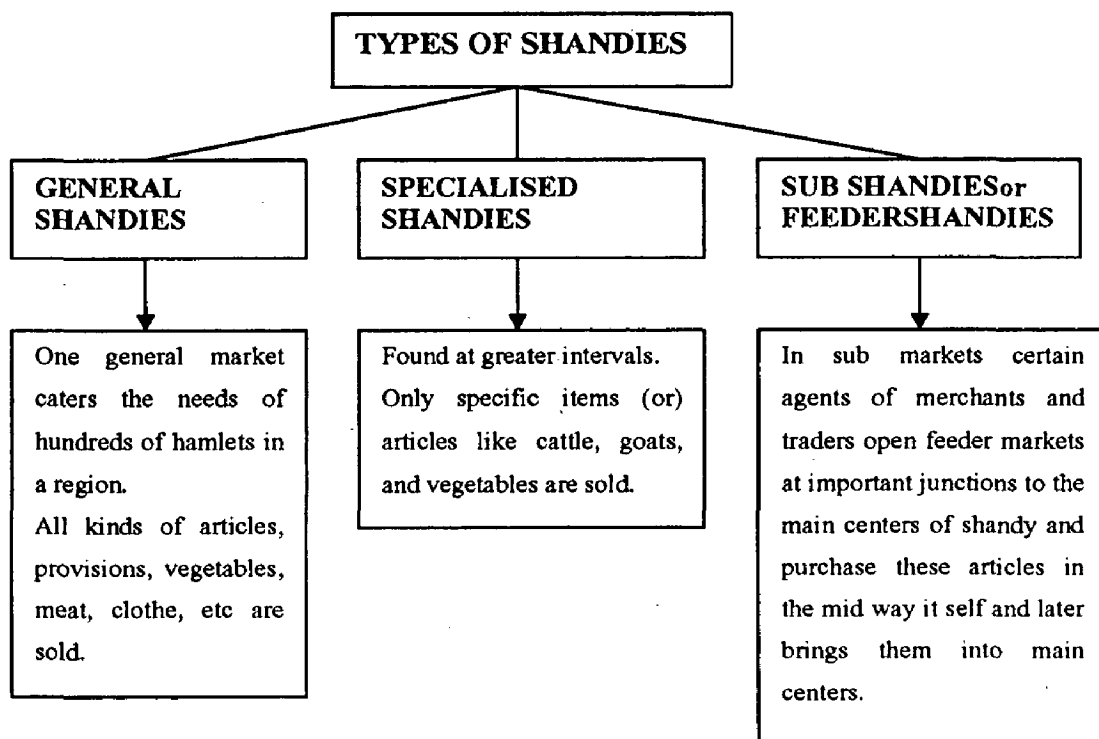
Detail - A

Fig: 1.7. Sketch of a Typical Shandi

“THE WEEKLY MARKETS ARE MOST COMMONLY LOCATED AT THE FRINGE OF A MAJOR VILLAGE BY A MAIN ROAD.”

TYPES OF SHANDIES:

1. **GENERAL MARKETS**
2. **SPECIALISED MARKETS**
3. **SUB MARKETS or FEEDER MARKETS**



- The weekly markets or shandies are organized at fixed places and fixed timings on a particular day of the week.
- In view of the long distances, tribals prefer to purchase and sell before noon & return to their respective villages.
- Most of the weekly market places have shelters provided by the Govt. which are found to be unoccupied.
- More over they are unnecessarily large compared to the traditional shelters which fit into the purpose.

“A ‘SHANDY’-HAAT OR A MARKET IS A PERFECT SETUP WHICH PORTRAYS THE CULTURE OF THE TRIBALS”.

Means of transporting goods to the market place along the hilly tracts from the remote villages.



Fig: 1.8. A Tribe Couple carrying goods for Shandi

The weekly markets are very popular economic institutions. In this economic matrix, certain social and cultural exchange also takes place and also these are important places where marriage by capture, mutual love and friendship takes place and also these are important places where marriage by capture, mutual love and friendship takes place.

They make mats from reeds and umbrellas or plates with ‘adda’ leaves. There is a certain amount of oil pressing at the individual level for domestic use.

Most of the tribes have a habit of maintaining a small kitchen garden to meet their daily needs. The professional men like drums, liquor collectors (*kallu*- local name) and village priests etc., have the advantage of some additional earning from their trade. There is practically no fixed and reliable source of earning for most of these tribes, excepting a few, who are well off.

1.8.9. FAMILY COMPOSITION

The family composition and the system of marriage of this society is typically similar to remarrying monogamy. The eldest son normally looks after his parents. Wife is often taken as a helping hand in cultivation, since cultivation in hilly terrain needs more labours as compared to that in the plains.

Due to the typical marriage system in the society, split in the family is accepted norms, immediately after the marriage the groom is supposed to establish his own separate family (primary family). Normally they prefer to construct their shelter near to their father's.

1.8.10. LITERACY

There has been particularly no formal education in the past, in these areas, only in recent times facilities of primary schools are available in a few of villages. Almost our ninety nine percent of the female population, and ninety five percent of the male population were found to be illiterate, rest of the population are from school going children, who are trained primary schools.

Every tribe has its own form of education. These tribes have its own language which was only a language until they began to study and write it both in roman and telugu script. There is a great amount of folklore, some of it is already recorded and studied by researchers.

The language (Lingua Franca) spoken in these area is Adivasi Oriya, which is the Tribal counterpart of state Orissa. Adivasi Oriya is an Indo Aryan language. Other languages spoken here are Konda Dora, Kupia, Khond and Telugu, Khonds speak "KUI". Telugu has come in as an outside influence.

Basically the tribes of the villages under study do not have any script of their language, whereas other tribes in this valley have been writing a form of Oriya script for a long time on palm leaves which are formed into a book by the State Govt. Only some people were taught that kind of script for religious texts. The teaching and practicing was done on fine earth taken from terminate hills and spread on a slap of wood. The script was then inscribed with a pointed stick.

1.8.11. RELIGION

Tribal region consists of three elements, the worship of gods and spirits, the death rituals, and the totemic ceremonies. The tribes have a great belief in spirits, they believe that the spirits of the dead constantly watch with interest and concern the doings of the living, tender them advice and sometimes even revisit them. Every village has got its own '*Demudu*' (God). They perform the festival of their God in '*vaisakha*' month i.e., in May.



Fig: 1.9. "DEMUDU"--village "devata".

Rituals are performed mainly to avoid sickness and death. It is the central dynamo of life and the link which binds him to the secrets of nature. In other words, myths allow him to come to terms with nature's varied and bewildering phenomena. The tribes never tried to either dominate or outwit natural forces, but they learnt to live with many of their harsh forms.

Myth is an experience which establishes man's kinship with everything around him. It reinforces his faith in himself explaining simply the rationale behind whys and where forces by clearing the doubts and question marks posed before him.

There is religious toleration among the tribes. Some of them have been converted into Christianity by the propaganda of Missionaries.

1.9. MOSAIC OF ARAKU VALLEY

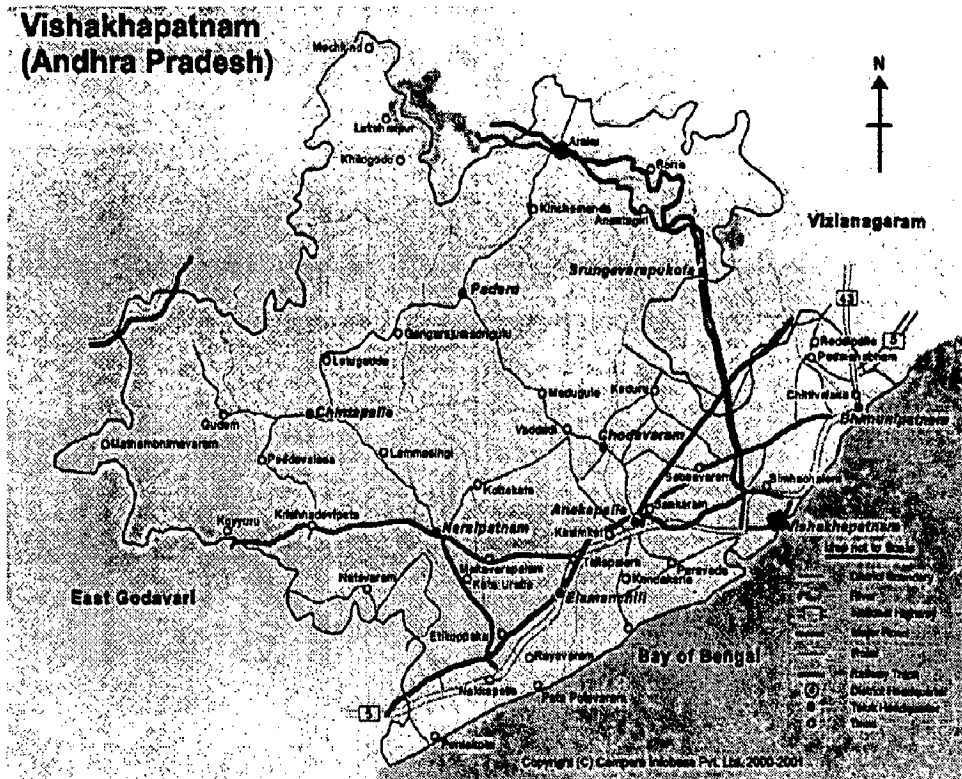


Fig: 1.10. Mosaic of Araku Valley

(a). Physiographic: Narrow plated or full ridges

Very steep hill slopes

Valley lands.

(b). Climate:

- Temperature varies from 3^o to 30^o.
- Summer --- Mid March to Mid June
- Monsoon --- June to October
- Winter ----October to February.
- Climate----- the mean annual percentage of humidity is 70%.

- **Location:** 115-km From Vishakhapatnam, Andhra Pradesh
- **Unique Feature:** Tribal Inhabitation
- **Altitude:** 600 To 900m – 3084'.

Araku Valley, 115-km from Vishakhapatnam district of Andhra Pradesh is close to the Orissa State, border. This place lures people with pleasant weather, hills and valleys. The natural beauty of this valley comes alive with its rich landscape.

Originally Araku Valley was part of Panchipenta Estate which covered a large tract of land in Visakhapatnam and Srikakulam Districts of Andhra Pradesh. This estate suffered debarment in the 19th century. The Raja of Jaipur purchased a part of it in 1903. Under the Estate Abolition Act, the estate was taken over by the Indian Government act, the estate was taken over by the Indian government on 20th June '55. Araku Valley came to Lime Light when it was originally planned to grow exotic vegetables to meet the demands of the military during World War-II.

Araku is broad picturesque and rich valley situated at an altitude of 3084ft. from mean sea level. The valley mostly consists of grass land and cultivated fields and a number of perennial hill streams which run through it, locally known as Geddas. The forest in the area is of a semi-deciduous type.

The journey to this place on the Ghat road with thick forests on either side is in itself interesting and pleasant. One can have a wonderful trekking trip. 46 tunnels and bridges will greet us on the way. The Ananthagiri hills on the way to Araku Valley are famous for coffee plantations. Borra Caves located 29-km from Araku Valley, are one of the famous nearby tourist attraction. The nearest railway station at present is Araku in the South Eastern Railway Zone.

Araku Valley(colony) is the key centre for developmental activities undertaken by the State Government in this Hilly region. A govt. Hospital, a Veterinary Hospital, A post office, Bank and various Govt. offices and tribal exhibitions, Yatrivas are located here.

1.9.1. FLORA & FAUNA:

(a). Flora:

The flora of this area provides a rich variety. The large sized trees commonly found in this forest area are mango, jack, and silver oak.

The interesting species available in this valley are:

Name of Species	Botanical name
1. Sidha	Lagerstroemia Perioiflora
2. Ason	Terminalia Tomontosa
3. Paharia Sisoo	Dalbergia Latifolia
4. Pia-Sal	Petrocarpas Marrusapuim
5. Chakunda	Cassia Seimca
6. Sonali	Cassia fistula
7. Champa	Michalia Champaca
8. Bahara	Terminalia Balerica
9. Harda	Terminalia Chebula
10. Amla	Emflica offciralis
11. Jamun	Syzygium Cemini
12. Mango	Mangifera
13. Panas	Artocarpus Integrifolia
14. Ba	Ficus Fengalensis
15. Aswastea	Ficus Religiosa.

* Source: Office of the Director of Agr.l (Sc.), Araku.

(b). Fauna

The forest surrounded these villages, is the adobe of several varieties of wild animals such as Sampras, Wild bears, Leopards, Wolves, panthers and Bears. Varieties of colorful birds like parrot, sparrow, and wild crow are also found in the forest. Wood fowl and rabbits are abundant and move about freely in the hills. Buffaloes, cows, pigs, sheep, and goats from the domesticated live stock, but they do not belong to any well known species and there is no proper are taken by the tribes to improve their breed.

1.10. VILLAGES IN FOCUS

Two villages have been selected for study: - BODIGUDA AND KORRAY

(1). BODIGUDA – “*natures own village*”

Location:-

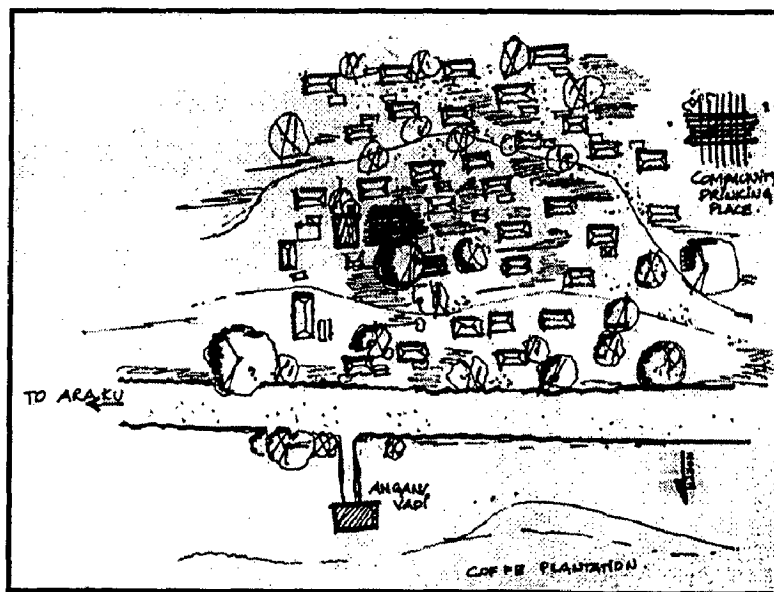
Longitude – $82^{\circ} 51'$

Latitude -- $18^{\circ} 21'$

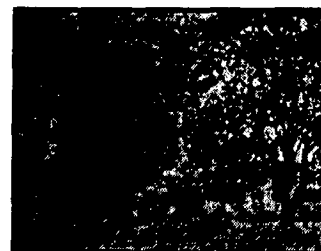
This village is about 13 kms from Araku village and linked with a samiti kuccha road which passes through western side of the village. This village is slightly off the main route, and situated on a hilly slope, facing the eastern side of the valley. The village shelters are constructed on terraces, and with thick vegetation.

“This tribal village is an effort to create an environment that is in sync with the nature”.

Layout:-



The isolated anganvadi building of the village.

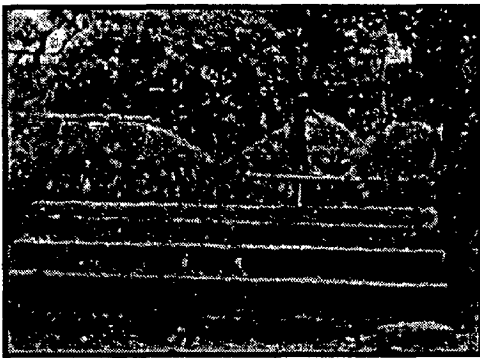


Large trees as gateway.

Fig: 1.11. Location Map of Bodiguda Village.

- No of house holds- 70
- Population- 296
- Building typology – mud walls and thatch roof.

The village of Bodiguda is a multi- tribal village. The tribes in the village have a hierarchy among themselves, according to their ranks, Kotia, Konda dora and Valmikies. Valmikies are considered as untouchables and the higher class avoids them from entering into their shelters. But however, in their daily life of the villages doesn't have any restriction on their interaction. They are located on the rear side of the village leaving a distance in between the two classes.



0.75m.high community platform at middle.



The village deity – which rolled down the hills.

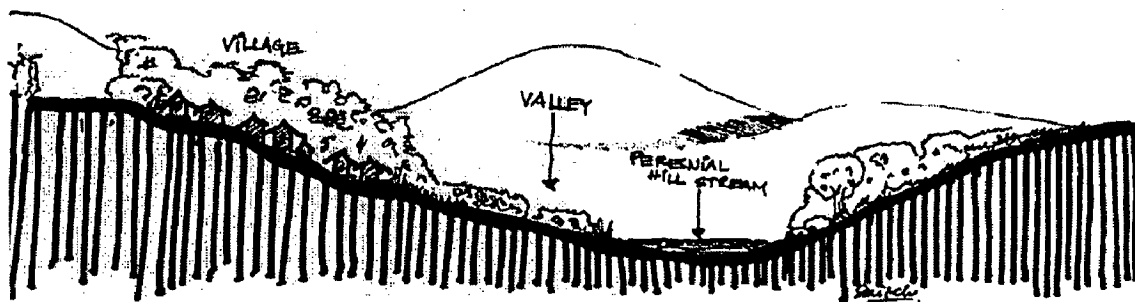


Fig: 1.12. Longitudinal Cross Section of Bodiguda Village

These villagers are agriculturists, and cultivate wet, dry podu lands. They grow crops such as paddy, maize, korralu, samai, chodi, oodalu, millet and adusula. This village has a perennial hill stream across the valley towards eastern side, which they use for drinking as well as for cultivation purposes.



Fig: 1.13. Section across Open space of Bodiguda Village

The cremation ground is situated on the southwest of hill slope. This village restricts its growth.

(2). KORRAI;

Location:

Longitude- $82^{\circ} 51'$

Latitude- $18^{\circ} 22'$

Area- 2.36 sq.miles,

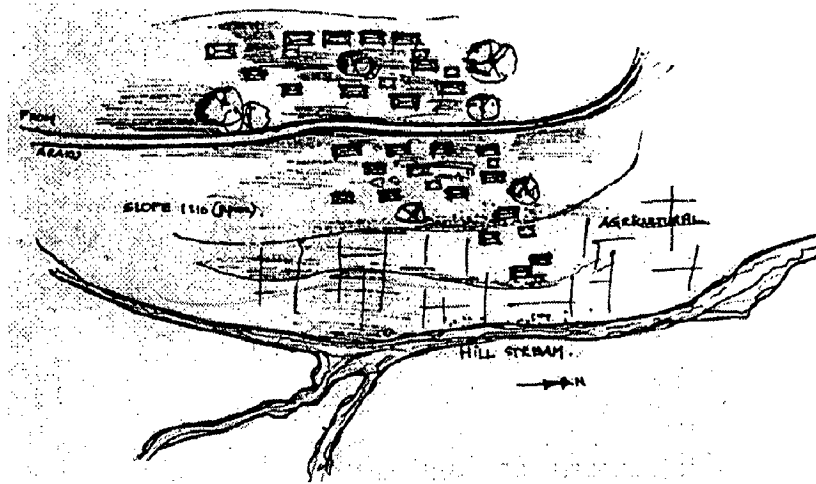
Altitude: - 3250 ft – 3050ft.

This village is situated on a hill slope, and about 16 kms from Araku village. The Samiti road crossing this village is in very bad shape, due to the irrigation work taken up by the I.T.D.A. there is a perennial hill stream just before the entrance to the village on the southern side, which is used for their cultivation, as well as for drinking water purposes on the eastern side of the valley.

This village is surrounded by many hillocks. This is an old settlement, could be about 50 years old (by village 'Karanam') but definite information is not available.

The tribes in the village have hierarchy of caste among themselves, are Bagatas, Konda Doras and Valmikis.

Layout:



LOCATION MAP OF BODIGUDA VILLAGE (NOT TO SCALE).

These villagers are agriculturists. They have a habit of raising kitchen gardens. This village has a one teacher primary school and a base camp for a medical officer. Therefore this village is directly under influence of direct people.



Fig: 1.14. Section across Open space of Korrai Village

This village has a scope of growth as it doesn't restrict emigration, and due to this no other satellite village is found near to this village.

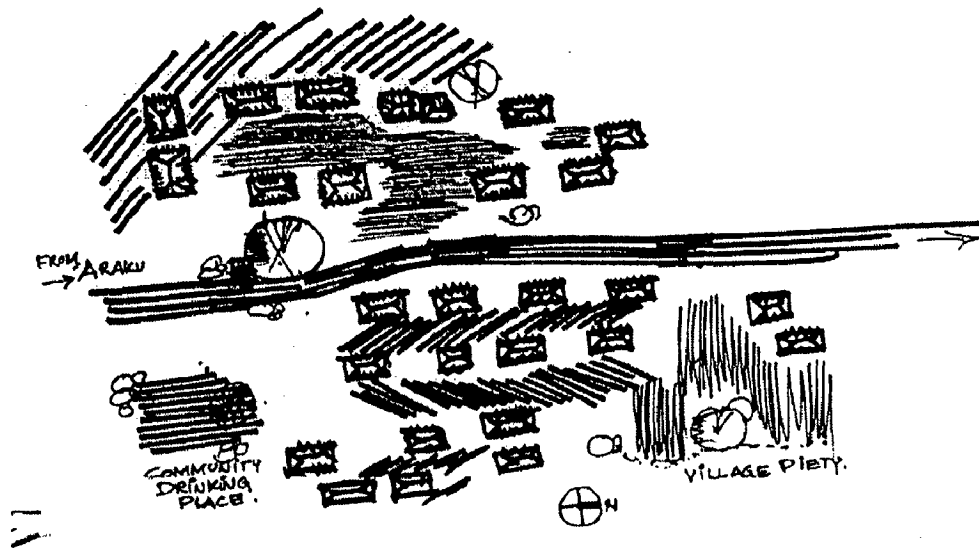


Fig: 1.15. Layout Plan of Korrai Village

CHAPTER- II

Field Study and Analysis

- | | |
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Anatomy of Tribal Architecture of Araku Valley



TRIBAL ARCHITECTURE: FIELD STUDY AND ANALYSIS.

2.1 VILLAGE FORM – STUDY AND ANALYSIS

2.1.1 Relationship in the setting

These villages are situated near to the old village of Araku in Araku Valley. The maximum distance of Bodiguda village is between 20-25 kms from Araku village. These villages are located in a very close proximity to various perennial hill streams having agricultural land around to their settlements.

These villages are connected with a partially kutchha road. But approach road to another village * is through their fields. They are so located that it is not directly exposed to the road. The villagers normally travel on foot, but for long distances they take road transport.

Both villages do not have any urban influence. The only social intercourse they have between the villages is in the weekly Shandy, at Araku village. Most of these villagers are settled cultivators having 4-5 hectares of land. Some time they do labour work for others on a daily cash payment basis.

2.1.2 Socio-cultural

These tribes feel that if their settlements are too close to one another that may create a problem of quarrelling between the communities. Whereas they desire to be near to their fields. In case of any quarrel among the villagers or when their views differ from others they are asked to leave the village. This is predominant in villages.

These villagers believe in burying their deads, and their ceremonial grounds are kept away from their villages.

2.1.3 Socio-Economical

Most of these villagers are agriculturalists and depend on the agriculture produce. So prefer to remain nearer to his fields. Most of these fields fall on the valley side, and the outward view from the village gives a clear picture of their field. The

economically weaker section like valmiki's in the village* does some kind of labour work, either in the neighboring villages or prefer to labour for Govt. organizations.

2.1.4 Socio- spatial

The uniqueness of the village plan (Ref. village plan 1st and 2nd) lies in the major focus provided by the large negative central space, which acts like a social lung of these villages, with the dwellings themselves forming the perimeter ring. But somehow this space is not crowded on all sides by their shelters, they also try to maintain their scale in and around this open space.

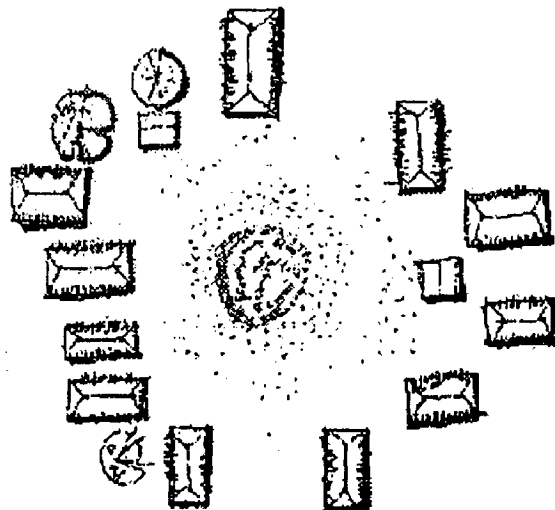
COMMON LOCATION:

“FESTIVALS AND COMMUNITY GATHERINGS”

FESTIVALS ARE AN IMPORTANT AND COLOURFUL PART OF THE TRIBAL SOCIETY- “They signify the regard given by the tribes to “Mother Nature” and their attitude towards their work (profession) which is totally dependent on forests.”

THE RITUALS DURING THE FESTIVALS INCLUDE MAINTENANCE AND REPAIR OF THE HOUSEHOLDS IN FACT THERE ARE FESTIVALS EXCLUSIVELY FOR CHANGING THE THATCH OVER THE ROOF, REPLASTERING THE MUD WALLS AT APPROPRIATE SEASONS (OF AVAILABILITY OF MATERIALS AND CLIMATIC CONDITIONS FAVOURING THE PROCESS).

The focus of the community action have emerged open spaces formed by the pattern of grouping of houses are the major places of social interactions.





“DANDORA” for summoning the people to the community place for a gathering or for an important announcement.

Fig: 2.1. Sketch of “Dandora”

This accentuates the special nature of the Araku green, which also becomes the ground courtyard of these communities. These spatial forms may be compared to a large public park or green in a metropolitan city, the contrast is here more intense and psychological impact more satisfying, since it supplies not only an area for recreation but also for the serious meetings.

DIMSA: - (A Tribal Dance)

‘Dimsa’ a tribe dance had its origin from ancestors particular to all their traditional performances is in existence among the different communities such as Bagata, Konda Dora, Valmiki and Gadaba.

Besides exhibiting their joy they had inherent motive to educate their ‘Kith’ and ‘Kin’ to teach the ways of living in forest area safeguarding themselves from all sorts of impending dangerous simultaneously securing their livelihood. In this approach the participants in this form of dance exhibit their total immersion by producing peculiar sounds imitating different situations which are occurring in their daily life, such as marriages, funeral functions, field activities, hunting and rituals.



Fig: 2.2. Tribal Dance- “Dhimsa”

Musical instruments in Dimsa

- Sonnai
- Dappu
- Thuduma
- Baka
- Kiridi
- Jodikommulu.

Ritual Room: Tribes generally worshipping their “TOTEM” symbols often an animal, tree, stone, bird or particular place or particular thing which is ritually related to the particular social group is call it is “Totem”.

Each tribe clan and sub clan has its own Totem symbols such as: MEENA (fish), KORRA, MANDIYAK, Etc.

Musical Instruments:

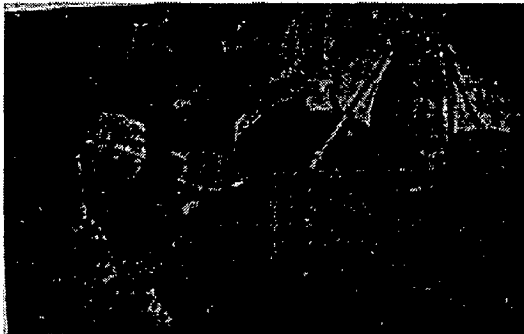


Fig: 2.3. Musical Instruments

Tribes are very jolly people when ever there is some leisure time, they go on singing and dancing some forms performed only by the man or women, some forms by the both men and women together.

Instruments what are using by the tribal artisans are all made of local material with own ideas—Bamboo, Leather, Wood, Bones.

Hunting Tools:

A part from the all activities in the Tribal societies Hunting plays important in food gathering and self protection from the wild animals. They designed their tools according to usage. In this society elder people feel their responsibility to train “Kith” and “Kin” through dance forms how to use and kill animals and how to escape from the animal attacks.

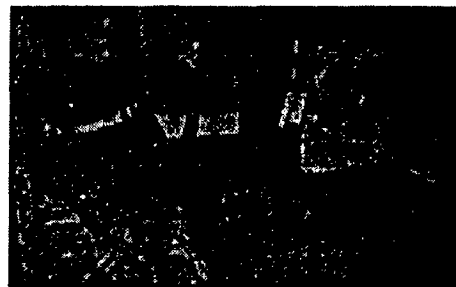


Fig: 2.4. Hunting Tools

Tools:

Weapons

Bow of Arrow
Pelot Bow
Spears
Tentu
Baku
Kagada
Axe.

Traps

Bird Traps
Fish Traps
Crane Traps
Rat Traps
Animal Traps

2.1.5 Play of externalities

They are very much afraid of burglars and not from the wild animals. This reflects specially on 2nd village where, even the approach track is difficult to locate for an outsider, as it is very well camouflaged behind the hills and thickly vegetate.

An Urban influence is slowly creeping in among the younger generation, while they have started using modern clothing's and aluminum: utensils etc.

As village 1st are looked after by some outside agencies in some way or other, specially it could be noticed with the converted Christians, those who have already started showing some mark difference in their behavior compared to other groups.

2.1.6 Findings and Inferences

These Organic villages relate most closely to their natural environment, built of local materials left in their natural state also relate closely to their hilly surroundings. Actually accentuate the configuration of the terrain and thereby reinforces the natural form.

The choice of village setting used to solely depend upon the natural resources available like cultivable land, water sources, natural local building materials etc., of late however; certain external organizations which provide some added amenities have had an impact on the village setting and form. In other words, these external agencies have curbed the shifting settlements. In this aspect climatic and defensive factors play a minor role.

The forms of these villages reveal a sophisticated network of communication and resultant sequence of spatial experience. In the daily ritual of the Inhabitants,

there is a constantly changing experience from light to dark, from intimate to expansive. Therefore, within the limits of these Girijans, there is a basic order of design and sophisticated variety of experience.

2.2. CLUSTER AND GROUPING – STUDY AND ANALYSIS

2.2.1 TYPE (physical)

Villages are of a linear pattern, according to “Manushyalaya- Chandrika, Ch. 3, Sloka 19”, such a village is exclusively inhabited by a single patriarch with his family and retinue.

Mostly house groupings are made according to their social hierarchy of caste system, especially in both villages. Wherein all four scheduled tribes are residing. The lower caste is pushed at the rear side of the village, where higher class live at the entrance of the village. 2nd village have been planned according to hierarchic order of caste system in the direction of Sun’s movement. The village chief’s house is so precisely in the spot of rising Sun that one can tell from its location. Specially 1st village*, it has been separated from other row houses just for this reason making it a dominating feature. In other villages they have tried to emphasize the village chief’s house either by locating it in village open space or by raising it so that the roof of this house is visible from all directions.

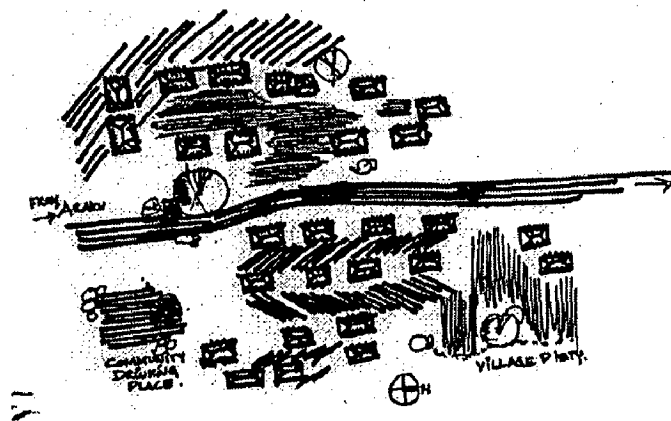


Fig: 2.5. Clustering

Normally a group of the same caste constructs their houses in one place, other facing each other leaving an open space in between or cluster at a place in such a way that a definite segregation is marked by a road in between.

Basically the nucleus shelter and cattle sheds are owned individually in 1st village. Therefore, it has been located either at the side of the shelter or the from front in the open courtyard of the shelter, so that it is convenient for them to protect and maintain their livestock. In the village 2nd as it belongs to a patriarchal family and the cattle shed is shared by them all, it is located just in front of the nucleus shelter. Even in this village one of the brothers has an independent cattle shed, thereby showing that the position of this ancillary unit is totally governed by social factors.

House construction is a dynamic process within the same cost, as they go for an independent dwelling immediately after the marriage, and a son build his shelter either attached or just by the side of his father's. Naturally, it closely resembles the former one, for the sees no need to improve upon it, rather it does not occur to him.

2.2.2 RELATIONSHIP IN THE SETTING. (PHYSICAL).

In these villages, houses are obviously, more uniform in style and fit in with the neighboring houses, following a more open and communicative pattern.

There is no harsh difference between any of the caste, except some physiographic barriers. Village 1st is restricting its growth as it does not encourage immigration while in 2nd the setting is left open, though it could only develop on the northern side of the village.

Mostly the open spaces act as element which segregate shelter grouping in village 1st where they need to distinguish the social class system otherwise like in 2nd they group around the open courtyard, but even a slight interference with the tribal customs they are asked to quit the village and go to a satellite settlements near to the same village, even in village 1st such cases are observed.

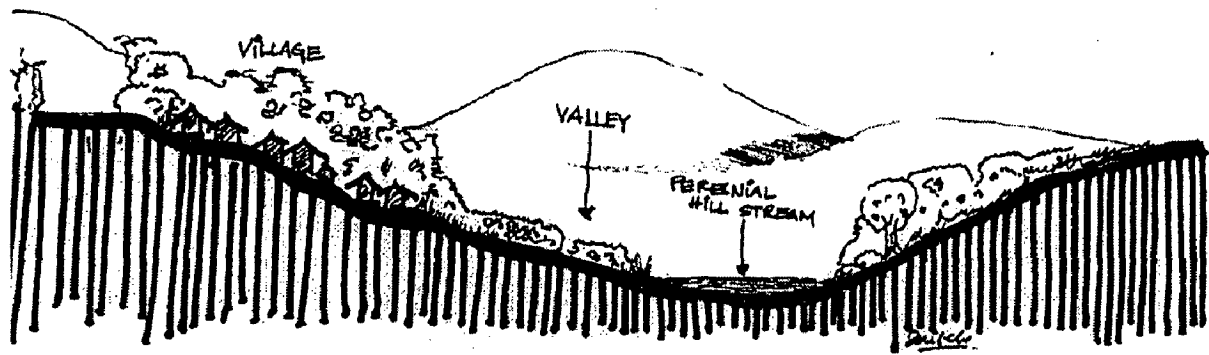


Fig: 2.6. Relation ship in the Settings- Physical

Shelters face towards the valley in all the villages, but they have also grouped their shelters facing each others houses when they want to have a feeling of belongingness, among the same family relation. Other than this the orientation of their shelter cluster are made in such a way that all short walls face the sun's direction in village 2nd , while in 1st village the natural hill terracing creates a shadow on the longer side of wall even though it faces the west, therefore it is in perfect harmony with the nature and surroundings.

Most of these villages' structures developed around a single negative space it may be a worship place or an exceptional village heads shelter like in both villages. In village 2nd focus is towards the village deity whereas in village 1st is towards the village open space.

2.2.3. SOCIO- CULTURAL

These tribals strictly observe the caste distinction. In village 1st clearly reflects from their house groupings, the lower caste are situated at the tail and of the 1st village even by leaving an open space in between the two.

Some times relations of the same family group their shelter at one place, A son builds his shelter after separating from his father just near the formers house, as it is a custom among these tribes. These groupings do not stop other villagers or castes to use their spaces. But in village 2nd, this factor does not play any role at all. The main reason for this could be that of belongingness which gives a feeling of security.

In all the cases it is found that the village head's shelter has been emphasized either by locating it right in the centre of the village, with an open space in front or by separating it from the rest. Sometime it is also located, along the Sun's direction.

For the Girijans most of the living takes place outside which has a far reaching implication on house form. The village open space acts like a lung for the whole village. With all shelters grouped around it.

2.2.4. SOCIO- ECONOMICAL

Probably cluster and groupings are directly affected by the economic status of the tribe, as it tries to dominate accordingly in village. In both villages, they do not encourage immigration any more, the growth of settlements is more or less static in nature. The most economical way of housing has been achieved by the Kodulu in their village 2nd, where they all share the same envelop of shelter, both Vastuka and ancillary units.

2.2.5. EXTERNAL FORCES

The higher caste in village, who are economically weaker have selected a place which is away from the village road, thereby giving them complete privacy in their daily life, where as the valmikis prefer to be near to the road side, where they are more exposed to the outside world.

These linear pattern of the settlements give them a seduced inward view of the village, even when they are working in the fields. Most of the village paths are so well defined that it automatically takes you the place of village importance. All their paths are hewn with some kind of small open spaces which acts like a punctuation to the total landscape of the village.

2.2.6. FINDINGS AND INFERANCES

These settlements reveal what buildings do, and how successfully they have functioned. Triblastic character is achieved by the close association of shelter forms, which is economically conceived within the limitations of the site. Although the village has taken a linear form on the terrace slope of a hill defined by cultivated land and hill streams, its individual components link up to form a tight, unified plan.

House groupings are decided by the social hierarchy of their caste system or unwritten laws which limit behavior pattern, in the different domains.

These clusters prove that man's relationship with his environment is two-way traffic. Abuse began degenerations. Harmony fosters peace, clusters are formed without hampering the natural site conditions in all the cases.

The unique, universal and infinite space of geometry acts like a tribal social lung, indispensable for the integration of his social, political and spiritual life. The length and width of these spaces depend on circulation needs as well as on natural terrain limitations. Thus, the size of the viaduct depends on the job it does.

The combination of front individual court yards and village open spaces relieves the Rhythm of the unit form and creates diversion alcoves along the village corridors, giving order direction and all the important sense of place.

Each order of open space serves a different need; the narrow paths offer protection from strong winds and harsh sun and provide psychologically soothing intimacy. The village open space is where the action is, and it serves as a combination of festive place, village meetings, visual focus and link with outside world.

2.3 SHELTER DESIGN— STUDY AND ANALYSIS

2.3.1 NUCLEUS PLAN(vastuka):

It has two elements within the envelop. These are the room and the verandah. The room, is the personal or family sanctuary where a man and a woman generate a human being which is a commitment to its sharing to the available space. The verandah is the transition to outside, the roof keeps the rain out and helps in making an enclosure.

Basically there are two types of shelters available in this region—(1) “ Middillu”, where the house has a double roof, the “inner roof” being plastered with mud, (2) the other one is of “Purillu”, having only one roof. These forms are governed by the economic status of a man. It is clearly reflected in village 1st, where the lower and economically weaker class i.e. Valmiki, has ‘purillu’ type house which is comparatively smaller in size, in a perishable condition, they even fail to repair their shelter, whereas the same caste living in village 2nd has ‘midillu’ type house, whose economic conditions are more sound when compared to the higher class i.e. Konda Doras.

Basically the Plan form is dependent upon the financial capacity of the individual. This aspect is revealed in many ways, a person having a sound financial standing in the community goes in for a more elaborate construction, having larger and more number habitable spaces, usually incorporating a loft. These constructions usually have a higher plinth 2’-0” to 3’-0”.

A person of a lower economic standing goes in for a smaller construction i.e., “Purillu”vastuka, in this case the loft is usually left out and the plinth is also much lower up to 9”- 15” size high.

In either case the basic plan form remains the same. A multipurpose room where cooking, eating and sleeping takes place is supported by a provision store on one side and poultry on the side, having an entry from the verandah. Every house has a verandah which acts like a transition space between the outside and inside. The

cooking space is always located near the main entrance door, hidden by the shutter opening, the cooking hearth of 15 "high has an attached side platform where the cooked food is kept. Immediate storage for cooking items is in the form of a 'JULI', suspended at the height of 2'-6" above the hearth, meant for storing spices and drying of meat. The store rooms are generally located on the side of kitchen, and sometime used as "puja room" too. They do not use this space for sleeping purpose. The access to the loft is either from store or from the multipurpose room.

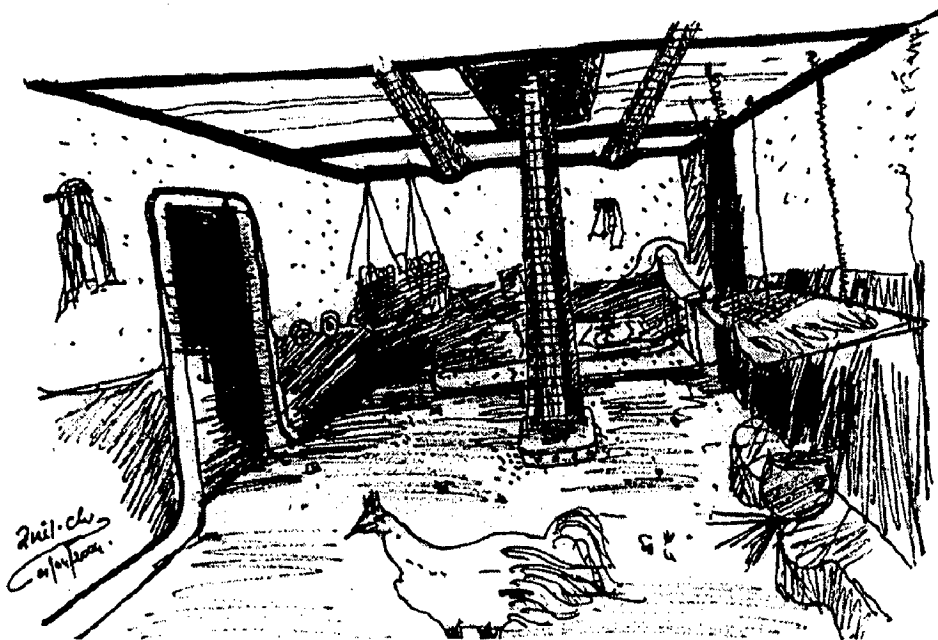


Fig: 2.7. An Interior of "Valmiki Tribe Shelter".

Where valmikis have kept the entry to their poultry pen is through their main room, are badly maintained. As 'Middillu' type house hold has live stock, the owner builds separate cattle shed just by the side or in the front courtyard of the house. These shelters has a paved and mud plastered courtyards of 12'x 15'. They generally do not go for fencing. But only in case where kitchen gardens are present, they erect and interlaced read fencing. They have other ancillary units like a firewood stand, which is always located on the rear side of a shelter, in the direction of a wind. Small paved platform are generally made on the rear side for bathing.

2.3.2 COMFORT

(a). Physical:-

Basically these shelters are so well designed so that house wife can very easily maintain her house. Every interior dimension is based on the anthropometric study. A house wife can control a house, even while cooking or preparing. Loft height is kept low so as to make it convenient for a woman to operate.

Anthropometric study

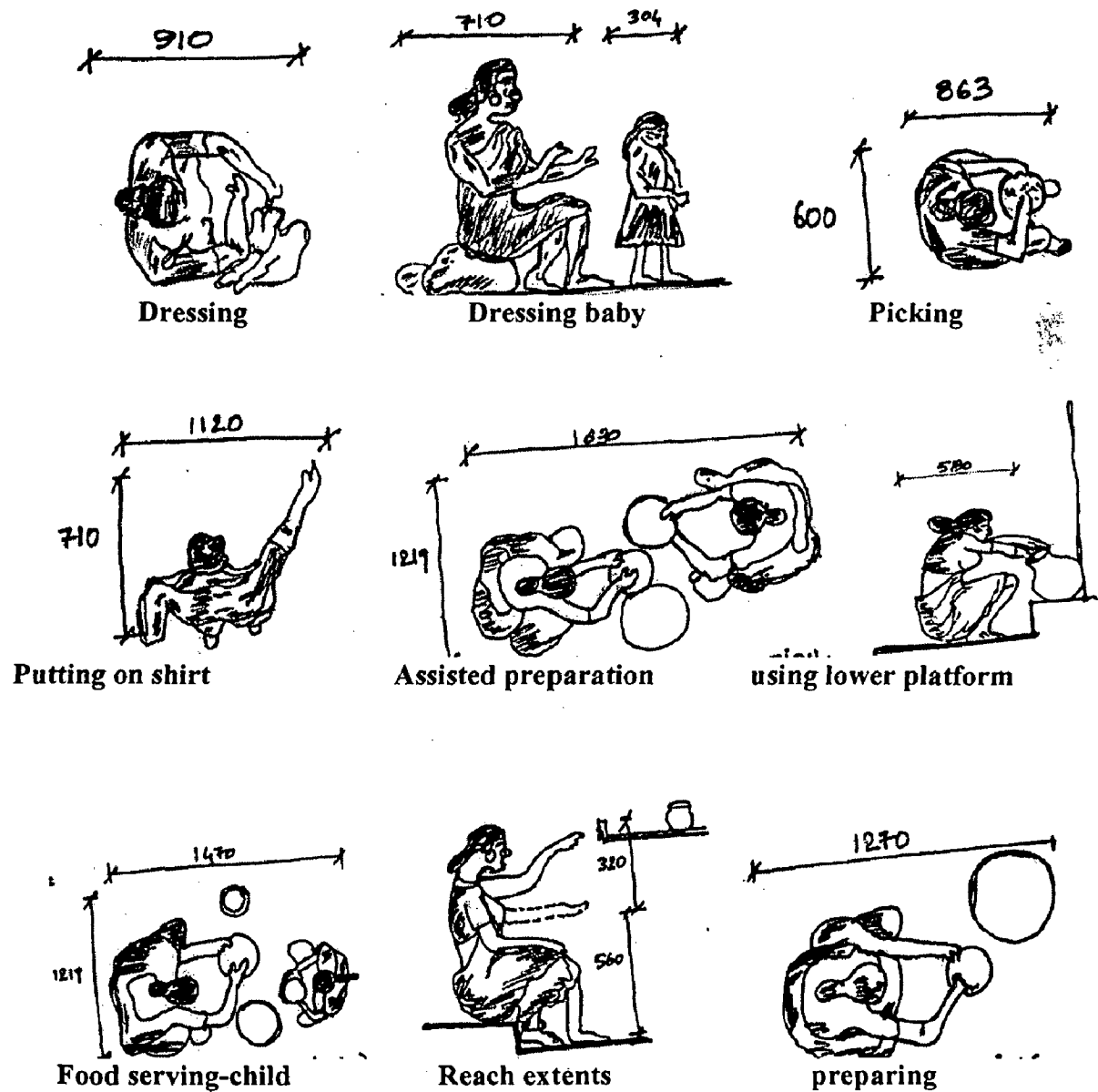
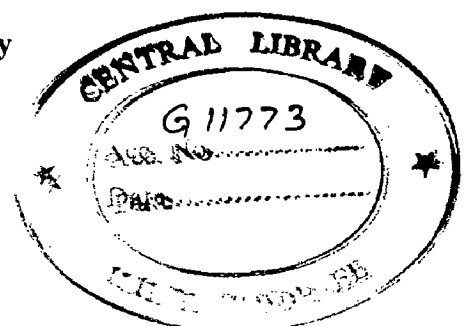
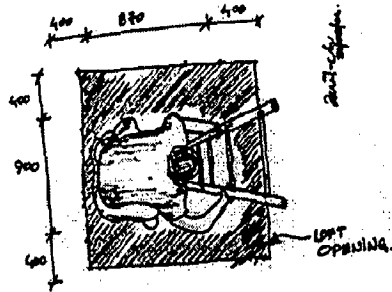


Fig: 2.8. Anthropometric Study

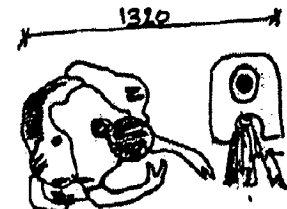




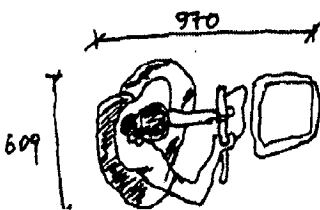
Climbing a ladder



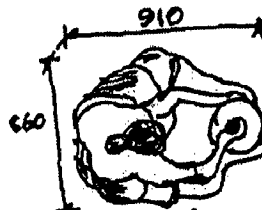
Heighting dimensions



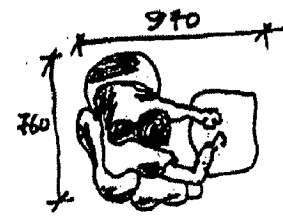
Cooking



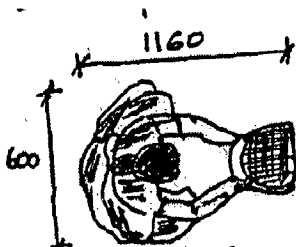
Lighting chulha



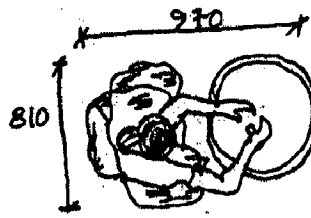
Churning



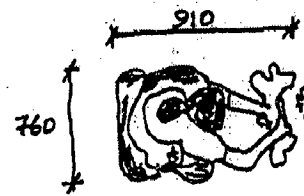
Taking out



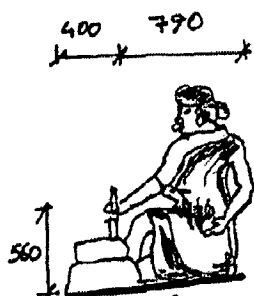
Winnowing



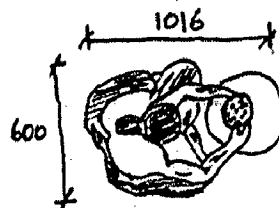
Mixing



Washing



Grinding



Sieving

(b). Thermal:-

These tribes mostly use these shelters for relaxation during leisure time, as they prefer to sleep inside, either they go for a wall to wall loft slab or a double roof

in the verandah, which helps to conserve the heat during winter and keeps it cool during summer. Even then in 'Purillu' type of house they keep a clear space between the roof and the upper structure for a movement of air, to keep the shelter cool. The roof canopy is so projected that it projects the mud walls from direct radiation of the Sun.

(c). Air movement: -

The Layout of the village is so well thought of that all these houses get direct fresh air. The only source of air entering the house is through the main door, which goes out through the loft opening. This creates a continuous fresh air movement inside the house. In certain cases a small 3" dia. Vent is also provided for cross circulation.

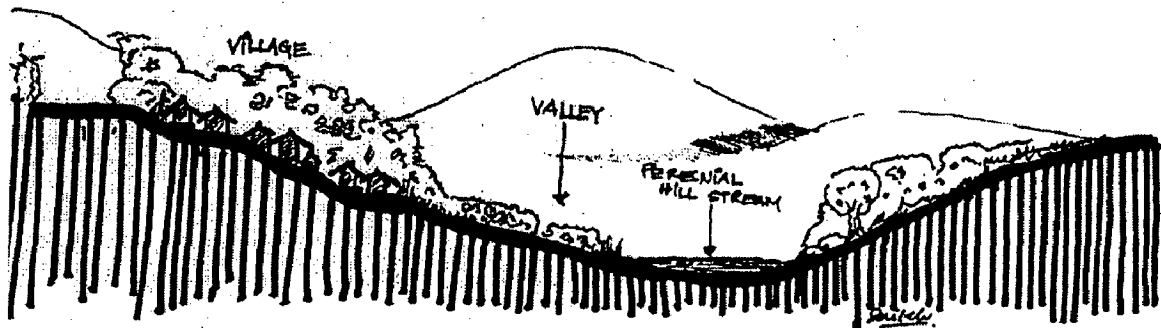


Fig: 2.9. Air Movement- Settlements

(d). Protection from dust:-

Most of the shelters have a paved courtyard in front or has a very rough undulating courtyard, which to a certain extent protect dust from entering into the house. Most of these houses have a high plinth and a door frame with threshold. The interiors are daubed with a mixture of mud and cow dung every week.

2.3.3. SAFETY: (unlawful entry)

These tribal villagers are not as afraid of wild animals as to theft, for this reason, all 'Middillu' type houses have either a heavy wooden carved door bought from the shandy or an ordinary door. Some of them even have a double locking system. In other houses the tribals do not give much importance to this. Therefore, it depends upon the individual's financial capacity.



Door (50 years old- as per Karanam).

These shelters do not have any wall of any sort, except around their kitchen garden in some cases which is meant for protecting it from stray animals.

2.3.4. PROTECTION FROM DAILY HAZARD

(a). Climate:

Tribals protect their superstructure and mud wall from collapse, by projecting the roof canopy by 2'-3' all round the building so that during the rainy season rain water drains out away from the wall surface. Normally they protect their plinth by storing logs abutting the plinth.

The external as well as internal walls are bedaubed once a week to prevent any cracks on the walls. On the rear side of the building they leave about 4'-5' gap, constructing a retaining wall to avoid any landslide during rainy season. The roof canopy in the front of the shelter is kept so low that it avoids direct solar radiation.

(b). Risk of Building Collapse: - Every shelter has some kind of plinth and the heights vary according to the persons 'financial' capacity. A 6" thin bamboo reinforced mud plastered wattle wall (Rivva), is normally constructed as a party wall or for their poultry pen.

The double roof also prevents dry grass from dropping into the living area from the roof.

(c) **Insects:** - A shelter which has a constant menace from snakes is protected by an indigenous method, by putting asafetida with water into small pits around the shelter. This has to be renewed on every month. In all other cases the plinth is so raised that it prevents small insects from creeping into the house. They even apply turmeric paste to their thresholds to serve the same purpose.

In most of the 'Middillu' type of houses, they normally put 6" layer sand in the foundation pit to prevent their structures from being infested by pests. All other members of the structures are given a thin coating of mud (collected from white ant hills) mixed with firewood ash. These are then painted with earthen colorssss prevent them against insect attack. Cooking smoke inside the living room also helps them in keeping out insects.

2.3.5. PROTECTION FROM PERIODIC HAZARDS.

(a) **High speed wind:** - All these village settlements are located on the shadow region of the wind, which helps them to protect their roof envelop.

(b) **Heavy rains:** -- These villages have fully utilized the natural slopes of the hill by making it into terraces, so that in case of rain, the water does not disturb their shelters. Areas around the shelter, village path are so well paved with stone that it does not permit any rain water to stagnate.

Most of their shelters have a double roof in one form or other. The main living area is always covered by the loft slab, and in case of the verandah a thick bamboo reinforced ceiling prevents any type of water leakage from the roof above to drop below.

(c) **Fire:** The most fire-prone elements of these tribal shelters are their thatch roof which is only separated by the intermediate loft slab, which prevent the fire to spread into the living area. In addition to this, their wooden structural members are coated with smooth thin layer of mud plaster, mixed with fire wood ash, to discouraging fire.

2.3.6. ANCILLARY UNITS

(a) **Cattle Shed:** There are owned by individuals of "middillu" vastuka in villages are located in the front Courtyard, of the vastuka, it is so located that the owner has a direct watch over their livestock.

Most of these structures are skeletal in nature without a plinth, having interlaced flexible reeds walls or walls reinforced with bamboos. The roof of these shelters is also similar to that of the vastuka, having “gopuri” grass thatching. The entire structure is erected on eight forked uprights tying is done with ‘addanara’. Normally this shelter has also a small stack for storage of fodder. This has only one small entrance which is closed with some kind of rudimentary wooden grille door.

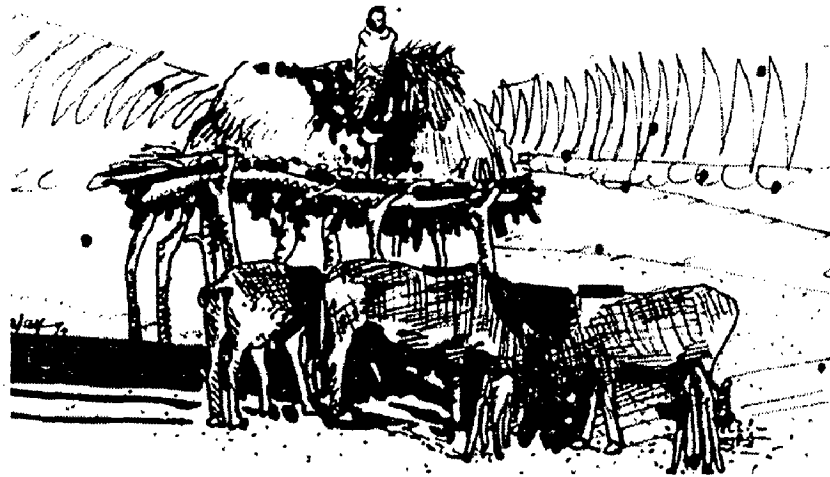


Fig: 2.10. Ancillary Units

(b). Field Shelter: This is a temporary structure which is constructed in the fields. It acts as shelter and tethering place for their cattle as well as a fodder storage platform. This is erected on five forked verticals, of 5' high at four corners, on a square piece of land, and all these poles are horizontally connected with purlins, on which they lay a platform made out of bamboos. For climbing over to the platform a bamboo stem with lateral shoots is placed in an inclined manner which serves the purpose of steps.

(c). Firewood stand: These are erected in the rear and of the vastuka with the direction of wind having two upright supports with a horizontal beam to support the fire wood kept in a vertical manner. The height of this structure varies from 5-6ft. surrounding land is always paved with rough stones.

(d). Place of worship: This is always located under an old Neem tree with an open space in front. Their form of diety is in stone or in hay, for which they made a small pit of 6'-7' with a stone bund around.



(e). Oil extracting unit: This is a community working space located under a tree in some corner of the village, where every one is allowed to use the tree, but the basic implements for the process are generally owned by each individual. In this process the whole family takes part to extract oil from seeds.

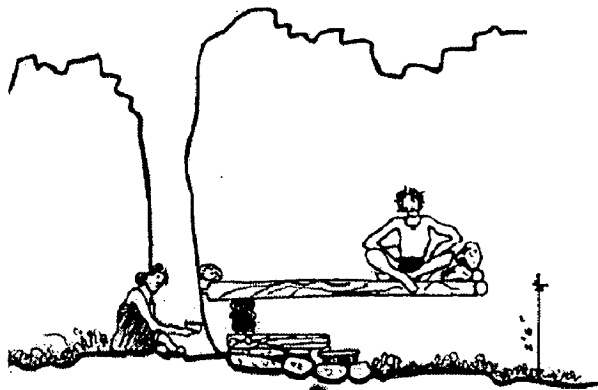
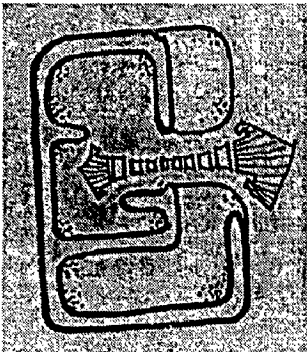
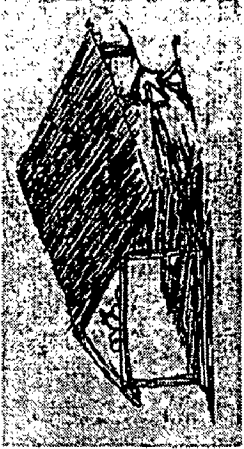
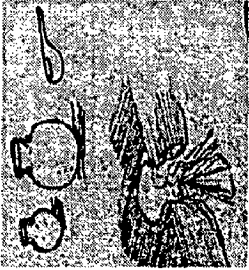
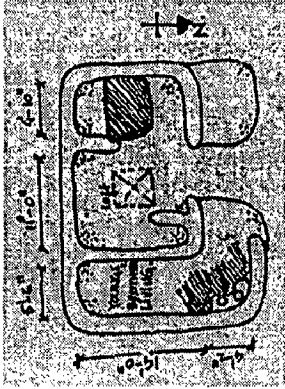


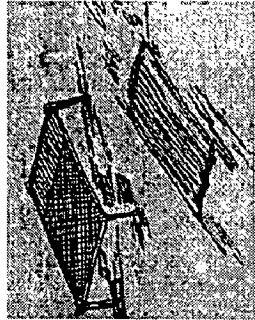
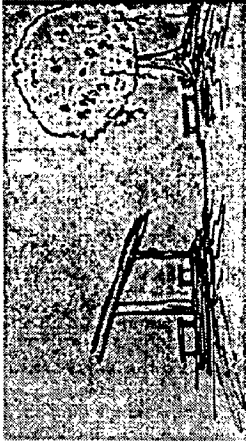
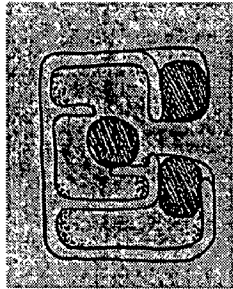


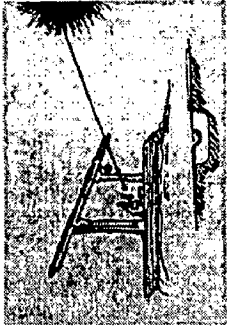
Fig: 2.11. Oil extracting unit


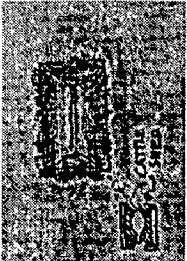

2.3.7. FINDINGS AND INFERANCES

From these villages, it could be said that they have a wide variety of architecture, which has gradually evolved over the years to meet certain conditions of the climate and daily life. Fundamentally their vastukas are built to shelter their family and to house his belongings.

All forms of their shelter, interiors as well as exteriors, are simply and economically conceived, none is wasted or misused.

S.No	Activity	Equipment	Space/ Location	Comments
1.	Entering and Leaving the House	Women carry utensils and men carry agricultural equipments.	0.6 to 0.8 wide doors provided generally. 	None of the house has any door towards the backside of the unit. (One way orientation). 
2.	Cooking: ---In Summer ---In other seasons	They are using winter and Monsoon. 	0.2m high platform. 	Kitchen is not regular and lacks proper ventilation and the smoke is most often causes suffocation-deposits black suit on the walls and ceiling.

5	<p>Sleeping:</p> <ul style="list-style-type: none"> --Outdoor --Indoor 			<p>Tree is an important element in house hold.</p>
6	<p>Children's play:</p> <ul style="list-style-type: none"> --For babies --Grownup child Reins 		<p>Babies play in the multipurpose room or in the verandah</p>	<p>Grownup children's play in the open fields, under the trees and in the front yard.</p> 
7	<p>Adult casual work</p>		<p>Owing to dark interiors- work spaces are in the verandah or right in front of the main door. Stone ware fitted to the floor for grinding grains.</p>	

8	<p>Water supply sources: Natural springs -Bore wells -Wells</p>		<p>Tribal community house hold prefers natural spring water which is fresher than the bore wells water. Which belief the spring water is more likely to be contaminated.</p> <p>Women carrying water from a distant source.</p>	<p>The incidence of diseases like cholera, typhoid is mainly due to the use of un protected water by the tribes.</p>
9	<p>Cattle maintenance During the nights the goats, sheep, chicken, etc. are driven into the store room to safeguard them</p>		<p>Cattle aggressive the sanitary problem as point of view. cattle from the health point of view are best kept away from the house but villagers may not be all included to do that for their- Love for cattle- fear of cattle lifting and fodder theft if stored away from the house.</p> <p>Base of collection of cattle dung- convenience of milking and feeding etc. - cow dung cakes are made for using as fuel for cooking.</p>	<p>Fodder container made out of stone- is the creative applications of the banality available stone.</p> 

CHAPTER- III

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Anatomy of Tribal Architecture of Araku Valley



3.1. PHYSICAL PERFORMANCE OF MATERIAL AND STRUCTURE-STUDY AND ANALYSIS.

3.1.1. Material

(a). Inherent characteristics and properties:

Mud is the basic raw material for all types of construction; it is used from starting till the end. The argillaceous clay which is mixed with straw and cow dung, yields to its pressure as willingly in building as it does in potting.

Thatch, apparently the most common roofing material locally known as “gopuri grass”, is meant for warm and temperate climates. It presents the advantage of being readily available in the form of fronds or fibrous stalks, of resisting the penetration of moisture when properly sloped and lapped, out of permitting the passage of air which cools and ventilates the enclosure or the Vastuka.

The mud plaster, earth collected from the nearby white ant hill is mixed with cow dung gives a beautiful smooth wall surface. Sometime it is also painted with earthen colours mixed with waste oil, to give shining surface on the walls.



Fig: 3.1. Earthen colors on mud wall

Timber collected from nearby jungles, solves their problems of complex building construction, as it is easy to assemble, by having loose joints and keeping the natural slope of the material. It also helps them to maintain and replace, whenever required.

(b). Purpose:- Weather and physical environment determine the materials available to a tribal builder. He chooses to work in wood, as the columnar shape of a tree might

have inspired him to organize his design accordingly for example, all forked upright members of the structure has same supporting details even if the column does not have the material fork shaped support, when it is cut from a log. Basically, it is the builders 'mental conception', not the material he uses, that determines the character of the product.

The use of thatch leads to a certain consistency of covering structure among these tribal shelters, since the attachment of bundles of material demands the use of a purlin spanning major ribs and rafters and the spacing of purlins are determined by the convenient length to which a specific type of thatch is cut and attached.

The uses of mud plaster on to the walls not only create an aesthetic appeal, but also make the shelter hygienic to live. Other organic material like applying a paste of turmeric paste to the walls or door frames helps to keep away all insects.

Sun is used to curve the mud structure, the absorption and evaporation of moisture by thatch helps to avoid condensation problem.

(c) Methods of Use: -- Mud is the basic raw material for all types of construction. The argillaceous clay is heavily diluted with water in pits very near to construction site, and then kneaded under foot. A mixture of grainy, greasy clay and sandy laterite soil is preferred for this purpose. Apparently, an admixture of chopped straw, hay, or cowdung serves not only as a building medium, but the microorganisms contained in them also affect the release of certain chemical and biological processes that promote hardening.

Walls are constructed by superimposed layer of mud building by means of overlapping. The argillaceous clay diluted with water and mixed with cow dung once applied by hand on the rough surface of the wall, give an interesting texture.

The log, which is generally collected from the nearby jungle in advance are well seasoned by leaving them exposed to the atmosphere. The 'forked' shape of the log maintained as it is and used as an upright supporting member for the ridge beam or the left slab. These logs are rough hewn with an axe and adze. Once erected they are then finished by applying colorful earthen colors on them or left as it is so that it can 'breathe'.

Stone which is normally used for pavements and construction of retaining walls are placed loose on the surface.

(d). Durability:- The mud wall which they construct, require a constant maintenance from time to time, like in villages, where valmiki are not able to maintain their shelter, due to poor economic status, their shelters are in a bad conditions, and once not maintained properly, these structures are prone to affected by terminate attack.

Age of timber members are increased by some kind of local indigenous techniques. In Bodiguda village, where the main supporting members are still kept in tact, which could be even fifty years old. The normal life of the roofing material is only three years and has to be replaced with new One.

(e). Builders Economy:- In all villages there is a limit to the extent to which building forms are controlled by builders economy. This limit is generally imposed by a builders financial capacity. It is so distinct that some time even when the modern materials are available within their reach, they are not in a position to use them for their building construction. All their shelter forms are determined by this factor, where the social status of a man does not play a significant role. Like in villages, the valmiki tribes, who are considered as untouchables, has a bigger size and better 'Middillu' type of Vastuka, compared to Konda Doras, same caste, those who are better off in another village has smilar 'Middillu' type Vastuka. But only difference which is noticeable in valmiki shelters that they are not able to maintain their houses even when they have sound financial backing.

Builder's economy also decides about the size of Vastuka and the locally available materials are to be used. In villages, valmiki, the poorest lot, are forced to have only a very perishable type 'Purillu'.

The cost of each Vastuka ranges from Rs.3500/-to 5000/-. The maintenance and repairs of their structures varies from Rs. 250/- to 500/-.

3.1.2. STRUCTURE: -- Logistic form based on physical structural variables.

(a). Climatic factors:- Resistance to lateral forces, such as wind or Earthquake, generally requires either rigidity or bracing. These structures having a very simple roof and supported by a central pole as well as peripheral columns. Since these poles are buried deep in the ground, the building acts as a rigid frame, although the flexibility of the members themselves assures some flexibility. Another way of

resisting wind is flexibility which often depends on the use of tied joints, is the use of flat strips of bamboo for the tied joints. These grip the cylindrical upright much more securely than would round tiles and is self tightening.

The use of double roof of thatch and thick bamboo reinforced mud ceiling to protect mud construction from rain, as well as for climatic reasons.

(b). Safety: - The construction of the inner loft slab, which plays a role of shield to inner living space. Mostly the surrounding areas of the shelter are cleared and proper pitching with stone has been done to avoid any kind of landslide. This also protect their plinth from damages during rains.

(c). Loads:- Vertical load carrying elements, which collect the forces from the spanning members and transfer them to ground, present and a distinction. Columns and bearing walls are relatively simple in concept, and their use is limited largely by their tendency to buckle, which restricts the height for a given thickness. In order to reduce the bulk of walls, they are reinforced with piers, which adds to their three dimensional quality, could be found in 'Purillu' type of house, where they have gone for wattle walls.

The horizontal loads are taken care by the 'one dimensional' 'A' timber frames, having the properties of tensile strength.

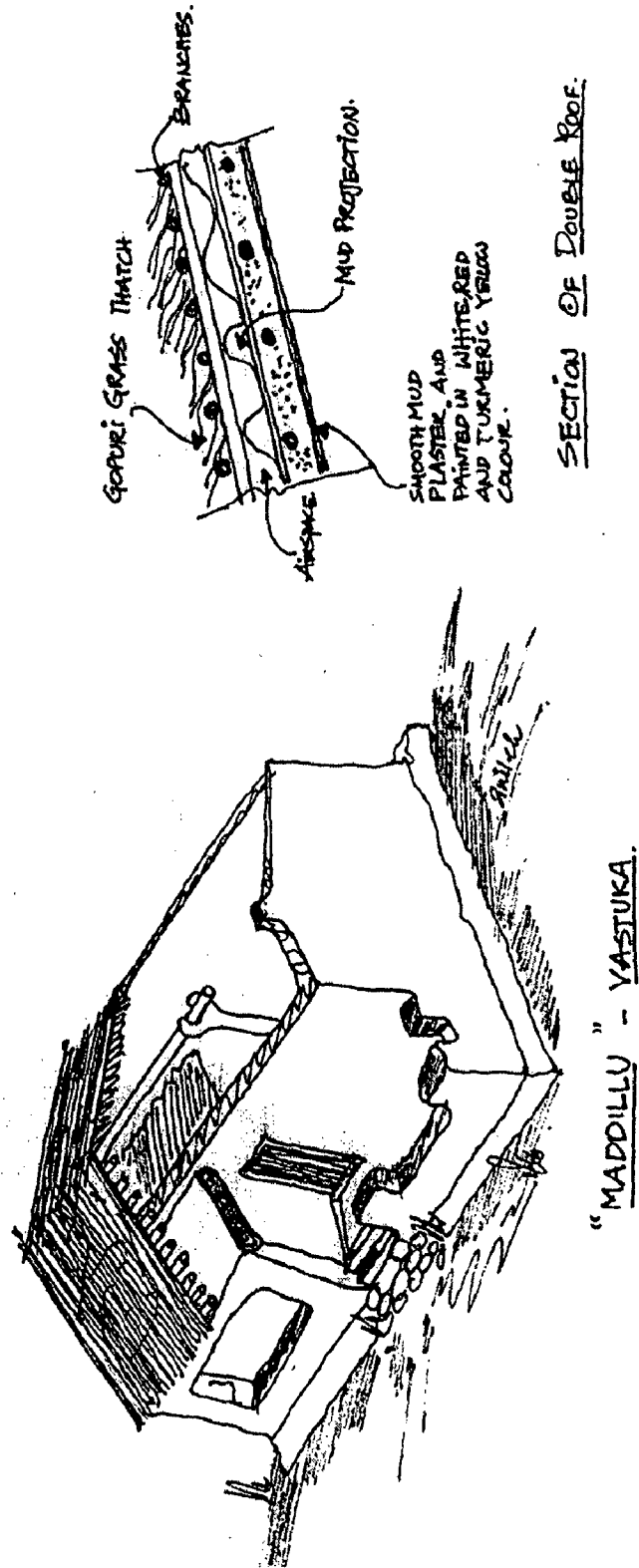
(d). The Design Requirements: - The central post plays an important role in a shelter and therefore is a sacred to these tribes, as they feel that this bears the whole weight of their shelter. This is indeed true, for the massive outer walls are only a shell for protection against the cold and the interior is formed by a series of supporting beams.

3.1.3. MAINTENACE

Mud plastering has deteriorated, especially in low cost houses i.e. in villages both, and even completely disappeared due to the lack o repairs. Normally the mud walls are bedaubed with argillaceous clay mixed with cow dung, which fills all the hair cracks from time to time on the walls, and helps it to harden.

The 'Gopuri shoot- grass roof' survives for three years, have to be beaten flat from time to time, which blends with entire roof giving an attractive texture. The other members of the roofs net work are replaced whenever the need arises. Maintenance of timber and other bamboo structural materials are done by applying fresh mud plaster mixed with ash or by putting kerosene oil on to them. The best maintained shelters could be seen bodiguda village.

Fig: 3.2. Middillu – “Vastuka”



3.1.4. Economy of structure

Mud which is freely available from the construction site is extensively used. Other structural members like wood and bamboo are normally collected from the market. Some time they also collect the roofing material from the forest.

Normally, they try to maintain their traditional technique, which has definite worked out economics for their environment.

3.1.5. Findings and Inferences

Tribal shelters combine persistence of form with ephemerally so substance; construction and repair are almost a constant activity.

The availability and the choice of materials and construction techniques in a tribal architectural situation greatly influence and modify the form of their shelter. Materials do not determine form, inspire of their fundamental nature. They merely make possible forms which have been selected on other grounds, they make certain forms impossible, and in acting as a tool, they modify forms.

Tribal uses the local materials with an admirable skill. Their wall textures and colors relate directly to the local climatic condition. The thick mud walls are built to keep them cool and warm during summer and winter, plus stucco is applied as protection from moisture; and white wash is applied primarily for its heat- reflective qualities.

Because of its strength and durability masonry is chosen for foundation and supporting mud walls. A combination of wood and mud structure offer good, unobstructed interior space, strong and durable perimeter walls, and excellent insulation qualities.

The simplest pitched 'A' – frame roof, a type of structure common to all these villages, affords an economical attic storage space that further insulates the living quarters below. The wood-bamboo framed roof frame is reasonably light weight and easily assembled and covered with locally available dry jungle grass, is flexible enough could be replaced whenever the necessity arises.

3.2. CONSTRUCTION TECHNIQUES- STUDY AND ANALYSIS

3.2.1. The most interesting feature of the tribal architecture is the painstaking construction of each of its elements. There is no need of any drawing work, each individual knows his needs, construction works are taken up during the summer months of March- May, when they are relieved from the heavy agricultural work, and when their roofing material is ready and well dried. Construction techniques are almost similar except for a few differences according to their beliefs; it starts after consultation with the village priest or with the 'Karanam' (Village Head).



FIG: 3.3. RIDGE BEAM BEING PLACED ON A FORKED UPRIGHT

Cosmological forces merely influence these village or shelter design. Only the village priest locates or decides the construction programme, generally beliefs and thoughts, differ from village to village.

The tribal hand is the basic tool used for shaping their architecture, it even reflects on their final products. Other tools which they use for the construction is a spade, crow bar, earthen pots for carrying water from hill stream etc. they also use grass thread for alignment purposes and wooden scaffolding of different heights.

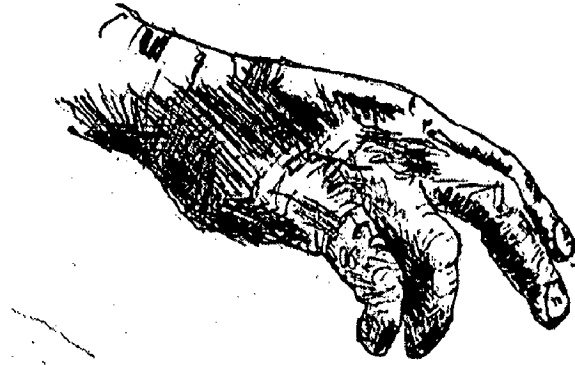


FIG: 3.3. NO TOOL IS MORE SENSITIVE THAN THE FINGURES. NO IMPLEMENT BETTER ADAPTED THAN THE HUMAN HAND

The total process for Vastuka construction takes place in one and half to two months. In the first month, they construct the super structure, and the next month is kept for the roof laying work. House building is a community enterprise for tribals. The house owner musters his relatives, villagers, and friends, and they all help. According to their financial capacity the owner Slaughters a goat, and organizes a community feast, once during the period of construction. Sometime a cash payment is also made to those who labor. Later, he reciprocates and in his turns helps to build another's house.



BEDAUBING OF MUD WALL WITH DISTRIBUTED MUD PLASTER, MIXED WITH COW DUNG.

They need only six males and six to seven female's helpers to complete a house construction. The main construction starts after consulting with the village 'Pujari', on an auspicious day. This occasion is known as 'Sankhustapana Muhurtam'. After cleaning and leveling the proposed site, they dig the foundation pits for footings of about 1-2 cubits, depending upon the site conditions. First they lay a 6" thick layer of compacted river sand on which they construct the footing with natural shaped stone in mud. For 'Purillu' type houses the depth of the foundation remains only at 9"-15" height, as they can save on the labor charges. After constructing the high plinth up to 3ft.height for 'Middillu' house they take up the super structure mud walls of 1'6" thickness, which is made of argillaceous clay, collected from the nearby site. Tribes those who can not afford to build such walls, go for simple 6" thick 'Rivva' bamboo reinforced mud plastered wattle walls. Mostly the height of the walls remains up to the loft height, ie.5'-6". They leave this for drying purpose for about 15 days.



THE ARGILLACEOUS CLAY YEILDS TO ITS PRESSURE AS WILLINGLY IN BUILDING AS IT DOES IN POTTING

All extra fittings like niches, shelves, pegs, vent opening(not more than 3" dia.) are fixed at the time of erecting the super structures, then they place a rectangular "Vasalu" or the ridge beam on the side walls, which is again supported from the centre by a forked upright member of 12"- 15" diameter. The woods they use for construction purpose are: Eugenia Jambolanum, Mangifera Indica, Artocarpus Integrifolia, Buttea fromdosa, Omelinea arborea and the like. They take one full month for constructing a super structure.

In the next month when the walls are already dry, they spread the roof frames made of bamboo. All the loose joints are tied with 'Addanara' and these knots are known as 'Pindikattu'. Thatching is done with 'Gopuri' grass by a few experts of the village. During this process, mostly man do the heavy work as compared to the woman.



SUPERIMPOSED LAYER OF MUD BUILDING BY MEANS OF OVERLAPPING.

After finishing the external envelope of the shelter, they put the door frame in position, which is normally manufactured by some outside carpenter or they purchase them from the Shandy. The weaker section manages with a simple interlaced flexible beam door.

The next important aspect of the construction of a shelter is the decoration of the house, which is exclusively a woman's task. Most of them paint their Vastuka, with the locally available earthen paints, after nicely bedaubing their walls and loft ceilings. They are very fond of using lamp soot black colour, this is used either for painting the dado of their cooking space or for borders along the soffit of the ceiling or skirting.



KNEEDING OF ARGILLACEOUS CLAY WITH WATER IN PIT, FOR HOUSE CONSTRUCTION, NEAR TO THE HOUSE CONSTRUCTION SITE.

They construct all their ancillary units in a similar manner, constructed with loose joints and by using simple techniques. Most of their village paths and village and individual courtyards are very nicely paved with stones.

Fig: 3.4. Construction Detail of Skeleton Structure

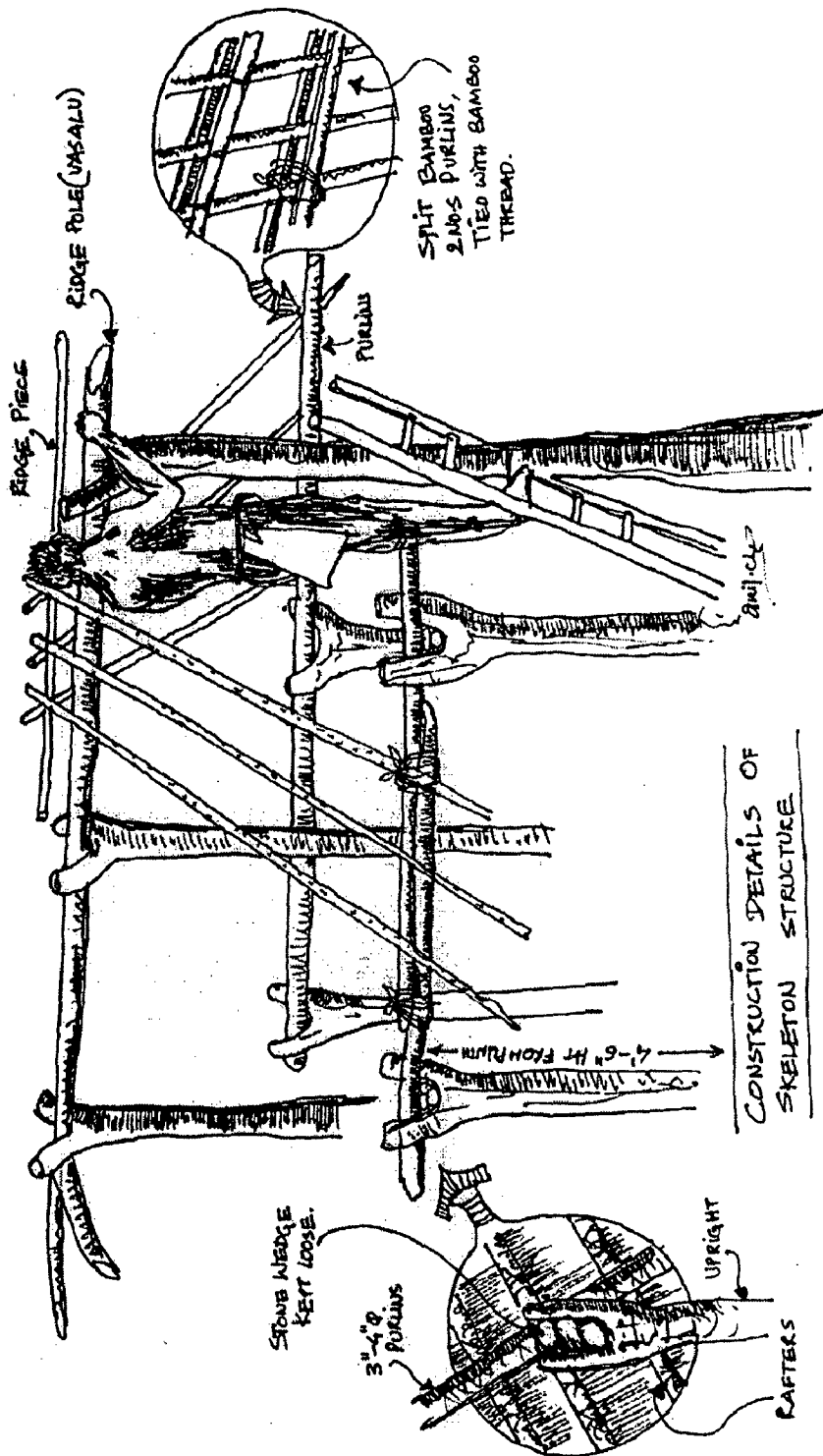
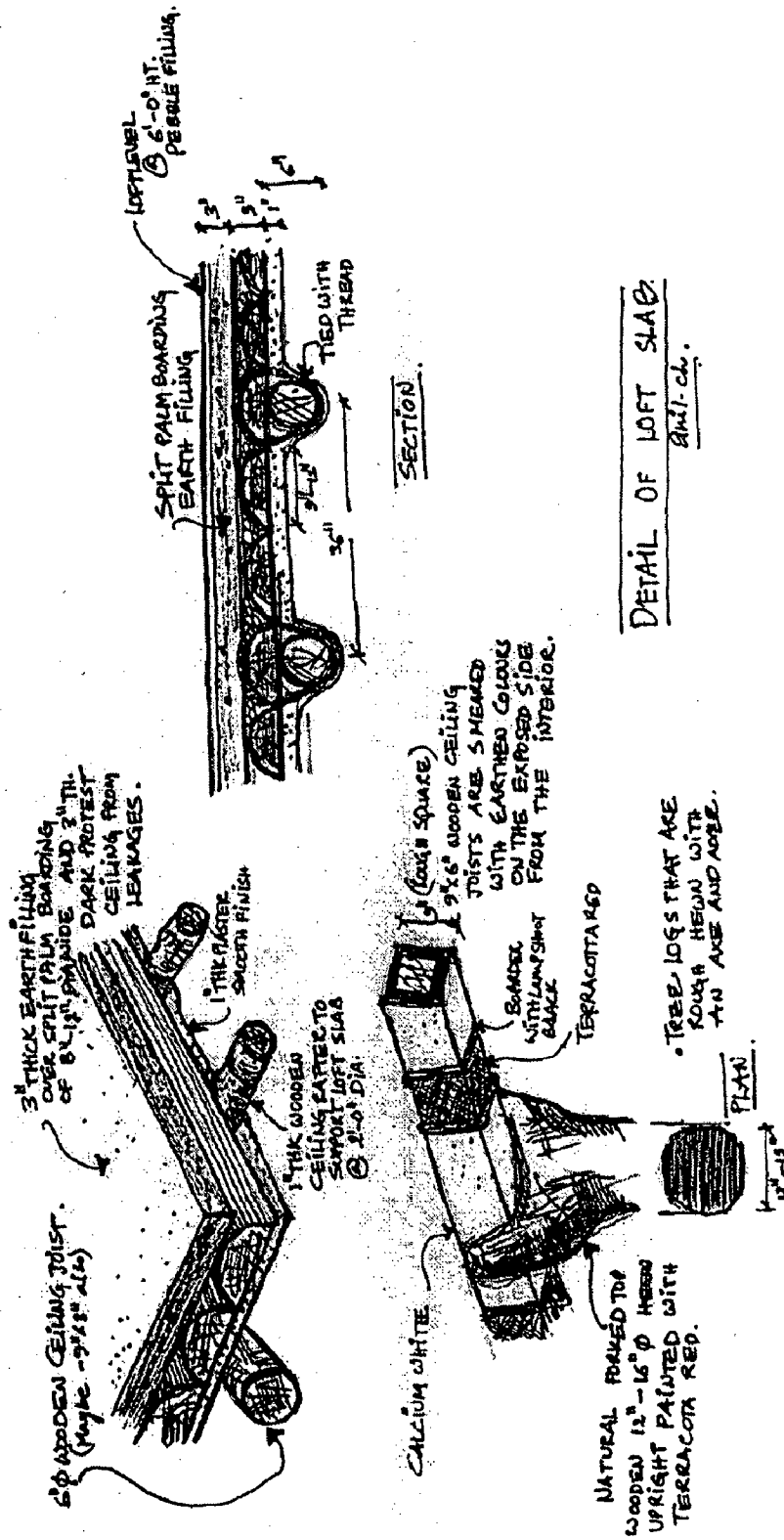


Fig: 3.5. Details of Loft Slab



3.2.2. FINDINGS AND INFERENCES

Tribal hands are virtually the only building tool. These builders use their hands with admirable dexterity, and it can be said that one can have the right 'feel' only with the hands.

Use of proper locally available materials like thatch roof with a false bamboo-reinforced ceiling or log boarding loft ceiling for insulation purposes and use of other heat-resistant materials for walls. The narrow streets not only provide shade in the summer but act as ducts for the circulation of fresh air.

A serious weakness in these tribal shelters is the lack of windows and other such openings. They generally claim that this keeps the Vastuka cool in summer and warm in winter; that it keeps out mosquitoes and other stinging insects; that it prevents evil spirits getting in; and lastly it prevents thefts and menace from wild animal. Moreover, we should not think of a tribal shelter as if it is a kind of building where a great deal of light is required, as at present none of them can read or write, in fact they do not have any script of their language, this of course, ignoring the fact that the only one village have education facilities. In fact, most of their life is lived outdoor and the house is a place for cooking, sleeping and for meetings after dark.

Their construction methods are so simple, and where it is a community affair, almost everyone knows his job. This Girijan custom of co-operative building, not only helps to overcome the complex building task, but also has social implications. If social aspects lead to a community enterprise, certain complex or difficult techniques and forms become possible. Men, women and children all help which express the family unity in economic and social terms.

3.3. TRIBAL AESTHETICS: - Study and Analysis

3.3.1. Heritage:

There is no other kind of art found except for certain amount of wall paintings. These Girijans, however are fond of dancing and are by temperament a gay and happy natured folk.

Most of the tribal women are fond of bedaubing their houses with colorful locally available earth, in spite of their caste and creed or the economic status of the

household. Economics does not play much role into it. Only in case of a widower or due to some physical inability of a tribe a house may have been neglected.

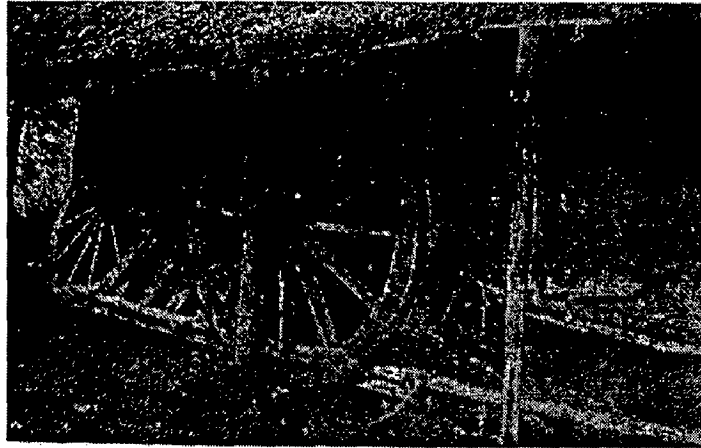


Fig: 3.6. Tribal Aesthetics

These tribes repeat again and again only that version of reality accepted in their community. Their symbols are not destroyed because they have weight of the past behind him.

3.3.2. Relationship to Structure

The basic plan of a large, square central space which acts like a social lung with low pyramidal roof around it creates a rich and complex multileveled tribal architecture. Roof, which is one of the most important elements of the shelter, mostly dominate the village silhouette. The uniform earth and red earth color and the repetition of cube give order and organization and units the total village form. The structures primarily of mud with bamboo and mango wood forked supports in the interior because of the thick exterior walls and narrow openings, which offer good insulation, the interior spaces are dark, intimate, and mysterious. This quality of space affords a necessary psychological security for the inhabitants of a village set in this environment.

They normally worship the different parts of their structure, as they feel every thing about it is sacred. The pole, walls, doors and floors are nicely decorated and worshiped on every festival, by hanging mango leaves garland around them or by

painting with turmeric etc. The central pole gets importance as it takes the whole load of the shelter.

The deep pockets and narrow passages between the two shelters brings to the inhabitants a visual relief and psychological security, as well as comfortable shade.

3.3.3. Character of the Structure

(a). Texture:- The wall of mud and the roof of thatch serve to merge. The village and the natural environment into an organic entity. The smooth mud wall having bedaubed with mud plaster creates an interesting surface as the mica particles shine.

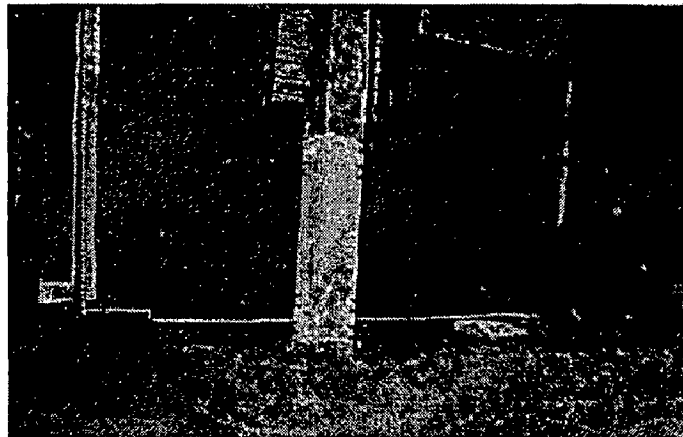
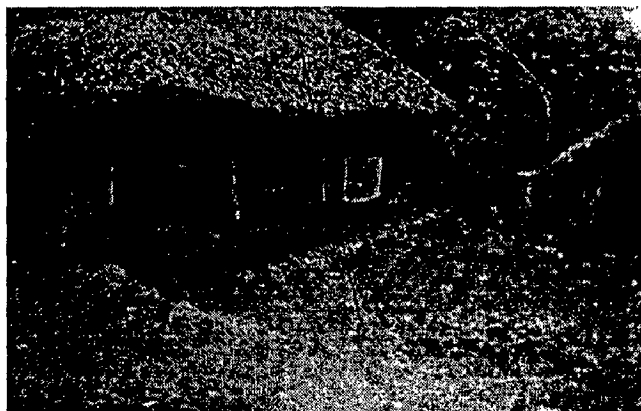


Fig: 3.7. Texture of Structures

The texture on the exterior of the shelter and on the village access possesses a nature of the practice of the usage of rudimentary materials.

(b). Voids: - Unlike in the architecture, of the urban area when the voids are treated with glass and other steel materials to enhance the urban aesthetic value, voids present in the tribal villages are simple and functional and fully utilized. The continuous appearance of punctures in between the tribal shelter which poses a unique feature of low level shades and creates a sense of privacy and also adds to the visual relief.

(c) Volumes: - The Vastuka which is a perfect example of hard plastic form looks sculptural in the surrounding, where as the punctures on the front wall gives a relief to the total form.



The ancillary units can be categorized as skeletal forms, except the seating area of village head in the 2nd, which again could be called as plastic form.

(d). Light Sources: - All the private spaces are kept dark, preventing the Sun's direct radiation from getting into the house, even though they spend very little time in the house is through the main door, or sometime they also provide a circular 3" dia. Vent hole, which again tilted down wards, so that the outside light does not hit the eyes. Even in the case of row housing, where they have even tried to protect the front verandah from direct glare, by using some sort of screen.

3.3.4. Organization of formal presentation.

(a). Ratio:- The growth of the developmental activities are more on the horizontal planes rather than the vertical cone, which are governed by the physical set up of the area and the functional uses of the spaces. This horizontal and vertical development (restricted) ratio seems to be the same both at the village form and also at the shelter design levels.

(b). Proportion: - In the tribal villages proportion does not tend to create any problem as compared to cities. Since the heights of all the structures are controlled and the use of appropriate building materials and the size of doors and openings are disciplined by a sense of traditional uniformity of unity.

(c). Colour: - These tribes seem to have very high sense of using appropriate colours in their shelters. Especially females those who have equal importance in the society, plays an important role to make a shelter lively. It has been observed that a family without a female member in it looks deserted. Their wall surfaces have been treated skillfully with highly stylized, abstract motifs and painted by the house wife, but with rich intuition and awareness of general love for beauty.

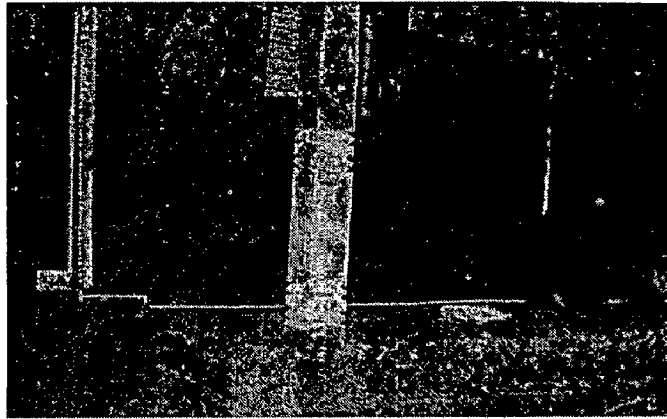


Fig: 3.8. Colors on Structures

Basically colors are used for decoration purpose, by using locally available red earth, turmeric yellow earth, and calcium bought from the shandies, plus lamp soot black, on the mud walls from inside and outside. These colors do not play any scientific role apart from keeping the interior neat, while external white color tries to reflect the solar radiation.

(d). Scale: - The scale is proportional to the limited architectures which are carried out in the village environment. The shelter act as a dormitory units with a low level cooking, which can be taken as a point in conformation of the roof height at a low level. One more fact adds to it is the general height of the tribal in these villages. The open spaces between tribal clusters, generally used for religious and cultural celebrations like (Dhimsa-Dance), wherein the number of people dancing to the area on which they are dancing is a sense of aesthetic proportion.

(e). Rhythm:- The combination of small and big open spaces along the village path creates a beautiful harmony along the horizontal space while the blending of the

rough textured pyramidal roof surface with the stone paved courtyards adds, the same rhythm into the total envelope of these villages and their surroundings.

(f). Harmony: - Physical harmony is achieved through unity of form and structure thereby giving the feeling of a dominating central influence in all these villages.

3.3.5. Findings and Inferences

Tribal art is vast and very diverse and does not have any historical frame of reference. The tribal aesthetics repeats again and again only that version of reality accepted in their society, either they assist in ritual or they perform a hygienic role. Their symbols are perpetuated because they have the weight of the past behind them. Tribal art is an endless incantation given to visual form.

One can feel from tribal architectural dimension, the intensely human thought and the whole creation throbs with life and vitality. Each and every form having same human scale, proportion, colour, and texture which harmonized with their surroundings is a perfect example of organic tribal architecture. Within the village structure there are always smooth and easy associations of forms and plastic continuity.

A tribe does not isolate colour from its source of perceptions (he, him self). Tribal architecture appreciation of work concerns the chemistry between a built environment and the tribe.

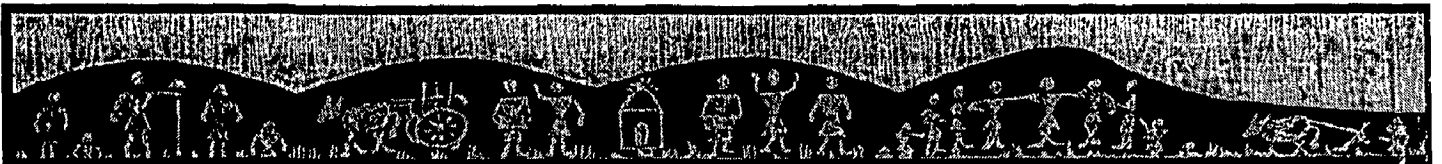
The tone and texture of the village is the same as its earth base, its scale and configuration creates a dynamic massing that tends to blend with natural topography of Araku. Secondly the painted surfaces clearly distinguish the community from other. Roof forms and texture are quite pronounced and are an important exterior physical expression. The use of thatch makes the roof an important natural decorative element in the shelter design.

These villages have its own human proportion and developed on modular dimension. The use of dimensions of hand, foot, palm, etc. by local builders has created not only harmony but has given these villages a tribal dimension.

CHAPTER – IV

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Anatomy of Tribal Architecture of Araku Valley



4.1. SUMMERIES AND FINDINGS

4.1.1. Village Form

In the past, the setting of these tribal villages used to shift with their shifting mode of cultivation. After the infusion of stable agricultural methods the choice of a village setting become more specific; depending upon certain natural factors like availability of natural materials for construction, proximity to a water source, easy accessibility to and from other inhabited areas etc. The role of climate and fortification, have played and still continue to play a minor role in this aspect.

The stabilization of village setting has facilitated the growth and grouping of ancillary units along with the living units giving each village a cogent form.

4.1.2. Cluster and Grouping

Cluster of dwelling spaces or groupings of the different units depend primarily on the social structures of the tribe in question.

In all cases, the positioning of the tribal chiefs house is of great significance. The houses of other families or members are grouped around this.

Ancillary units like cattle sheds, for example, are positioned adjacent to or in front of the dwelling units in cases where they are individually owned; otherwise they are combined into one large corral, positioned in front of the main unit.

Open spaces, either in the form of access ways or communal spaces segregate the different social groups thereby maintaining the delicate social structure. In all of these tribal villages, however a large communal space acts as the pivot around which the shelter units are constructed.

4.1.3. Shelter Design

(A). The Vastuka or Central dwelling space forms the nucleus of livable spaces wherein all activities like sleeping, cooking, eating etc., take place. This room is approached through a verandah. A store abuts the central living space.

Basically there are two types of structures, depending upon the economic standing of the family. One has a full double roof; the space in between is used as a store apart from helping to insulate the habitable area. The second type of structure has side walls up to a certain height, above which a grill of reeds reaches up to the roof, aiding cross ventilation. This type of structure has a small loft for storage.

In the former type of structure a space, housing livestock and poultry, is planned adjacent to the 'family sanctuary', as these are valuable assets to the tribes. In case of disasters when certain other dwellings are destroyed this space is converted into a living area where the affected family is housed temporarily. This shows that their shelters are flexible enough to meet diverse needs as dictated by their life style.

(B). the process of daily living of the tribes extends beyond the Vastuka, to certain other shelter forms which are covered under the head of ancillary units. They are:

1. Cattle shed(combined and individual)
2. Field shelter
3. Fire wood stand
4. Place of worship
5. Oil Extracting Unit.

Cattle sheds, as mentioned earlier, are either individual; attached to the dwelling of the family who owns the livestock, or they are combined to form one unit where the cattle is owned by members of the particular family set up. In the latter case this unit is located in front of the dwelling units. Either way the main reason remains that cattle or poultry are housed close to the nucleus dwelling units.

Fire wood, which forms the main source of energy for the Girijans is stored in their backyards. Timber is stored vertically to a height of 3 and half cubits along the direction of wind which helps in seasoning the wood.

Field shelters which are of a skeletal form, serve many needs. During the day cattle are tethered to the skeletal uprights with fodder and agricultural implements being stored on top. At night, mainly during the harvest season, these shelters are used by the persons who guard the standing crop against damage by animals or pilferage by others.

The main place of worship, for the entire tribe is situated at a strategic point in the village common, always under a tree which forms the shelter for the deity. Apart from being a place of worship this area is also used as the community meeting place.

The oil extracting unit is not housed in an enclosure. A tree and wooden pole form the machinery of extraction. The process consists of crushing seeds in the hollow of a tree with the help of pole. This is normally a family affair with all members of the family participation; each family takes a whole day to finish their work. The tree and the surrounds are common to the community and the poles and containers are, however, individually owned.

4.1.4. Physical Performance of Materials and Structures

Tribal structures reveal ingenuity in the use of local materials. The basic material used in all constructions is mud- the combination of argillaceous clay, straw and cow dung has been arrived at after years of experimentation.

The study structures of clay stand on masonry foundations, topped with thatched roof over a bamboo framework. The exterior walls are covered with stucco and finished with white wash.

The performance of these materials is exceptional under the prevailing climatic conditions and other external agencies. The thick mud walls help to conserve heat during winter and keep out the cold during the summer months. The “Gopuri grass” used for thatching, show excellent resistance to moisture, while still retaining its ‘breathing’ qualities.

These indigenous materials are easily replaced after their effective time span is over.

The lightweight materials chosen and the simple structural form adopted make their assembly and erection comparatively easy. Strong walls enclose spaces with relatively large spans. The roof form, consisting of a simple dimensional ‘A’ frame is supported in the centers by forked uprights in cases where the spans become large.

4.1.5. Construction Techniques

The methods of construction adopted in all these tribal villages are similar. The skilful handlings of indigenous materials reveal an honest expression in their structures.

Building a shelter is a community affair for the Girijans, with many families assisting in the construction process. The normal period of construction is about two months. In the first month the skeleton structure, consisting of foundation and superstructure, is erected. After a gap of a fortnight the roofing is placed and final finishing is done.

The tribal conceives his structure in his mind and proceeds to execute it with the help of his all purpose tool- his mind. His only accessories are a crowbar and a spade used for digging cut the clay.

The joining if wooden members are of an open type, with grass rope being used judiciously where ties are necessary.

Some interesting techniques are revealed in the protection of structural elements from daily hazards. A coating of thin mud plaster on wooden members help to protect them against termites. The coating of turmeric paste to thresholds serves a similar purpose. Pits are dug around the dwellings where Asafetida or 'Hing' buried, this helps in keeping away snakes and other reptiles.

The degree of detailing and finishing depends upon the economic standing of the family in the tribe. These take the form of ornately doors and smooth finished walls etc.

4.1.6. Tribal Aesthetics

The tribal aesthetic comprises of only that which is accepted in their society, inspired by their spiritual beliefs and experienced in their day to day life.

Every element is related to human scale, proportion, color and texture harmonize perfectly with the surroundings, forming a smooth transition from the inside to the out side. The tribals have developed their aesthetic sense from nature; hence there is an order in every form. Individual personality is tempered by traditional values curbing the tendency to dominate, resulting in visual harmony.

4.2. INTEGRATED EFFECT ON ARCHITECTURAL FORM

The architectural form of these tribal villages are not determined by any single, predominate force, rather it is an intricate web of many factors, which join together to create a cohesive whole.

The communal life style and traditions of the Girijans are responsible for the continuity in the pattern and layout of villages.

Since the Girijans spend a considerable part of their life outdoors, as evident from their activities, the basic dwelling is compact, housing only those areas which need to have an enclosure. Hence their dwelling spaces are cozy and intimate, offering privacy and solace after dark, in marked contrast to their hectic life they lead during the day.

Economics plays an important role in the design of individual structures. Within the tribal hierarchy a person having a higher financial standing goes in for a more elaborate structure, complete with a loft, higher plinth and a decorative carved wooden door. Ancillary units too are determined by the number of cattle or poultry he owns. It should be noted, however, that though it is within the capacity of certain individuals to use "modern materials and artifacts" they do not express any desire to do so. This view is instrumental in the maintaining a harmony of building form.

Climatic considerations are dealt with by the dwelling form and materials-thick mud walls, and double roof of "Gopuri" thatch on timber frames help to insulate the structure depending on the varying climatic conditions.

The natural materials available, along with the indigenous construction techniques and detailing adopted by the Girijans make for a unique architectural character, typical of the region.

These tribes take great pains in their preparation for building; materials which need seasoning, like logs, bamboo and 'Gopuri grass', are collected well in advance, prepared and stored, when they can afford to pay for labour in cash, or arrange for community feast, the building execution starts. Hence they do not face any scarcity or shortage once the construction activity is begun. This reflects on important character-foresight.

Cosmological influence, normally associated with primitive architecture is conspicuous by its absence. In other words their architectural forms are not affected by symbolism arising out of superstitious beliefs. On the country it could be said that

the architectural forms of Girijans have evolved out of their practical knowledge and collective approach to life, which directly exposes their feeling and emotions.

The scale of their shelters, open spaces and settlements is totally related to their life style so that each individual is able to identify himself as a part of his community, and the community it self as a part of nature.

In conclusion it could be said that these tribals have created an environment, which not only cares to their human needs but one which also blends completely with the nature, without upsetting the delicate ecological balance around him- He is still able to associate himself with the whisper of leaves, the song of birds, trickling of streams, the soft earth under his feet and the vast expanse of the sky above him from horizon to horizon- This is where- we as urban builders have failed miserably.

4.3. CONCLUSIONS

After studying and analyzing these tribal villages in total, I have come to the conclusion that their architectural characteristics and their immediate environment are expression of tribal community and need preservation. A rationalized and scientific approach towards the problem would permit continuance of such tribal spirit. It is possible that in our enthusiasm for doing good we may overshoot the mark and do evil instead, to the primitive people and gradually the culture of these people and its physical manifestation may wither out.

The solution in most house/ housing design has been based on health, climatic, economic and technological criteria, but this is too limited. Variables related to traditional social organization, family structure, symbolic values, cultural definition of environmental and the like should be considered and there is a need to see house or houses in the broadest social context- What could be called the **Cultural Ecology of Houses**.

The Life style and the Image of the users are much more important than Economics in designing in a village environment and at the same time it is important to consider the vernacular building techniques and material in the process of designing the shelter for the villagers, because the villagers do have a cultural and psychological linkage with their dwellings and the materials they use to build them. They do not easily accept materials foreign to them.

4.3. RECOMMENDATIONS

Specific recommendations emerging from this study of these villages are given below:

1. While planning for tribal welfare programmes, we should not over administer these areas or overwhelm them with multiplicity of schemes.
2. Tribal welfare programmes should be oriented towards retaining and enhancing their art, architecture and culture taking into consideration their attitudes and attributes.
3. Approach roads connecting these villages with one another should be maintained so that the basic amenities could be made available to them and encourage mobility of the people.
4. Modern methods of coating roofing material and other structural members with preservative, which do not affect their original characteristics should be encouraged.
5. Similar investigations of different tribal regions should be made all over the country, in order to get a clear picture of the respective tribal/ vernacular architectural characteristics, before any proposals are suggested under the guise of tribal development.
6. Certain material like the "Gopuri grass", which is replaced frequently, is becoming scarce. Areas could be allotted where such materials can be grown so that they provide a continuous supply without depleting the natural forest resources.

7. Studies connected with vernacular architecture can be introduced into the curriculum of architectural schools. If possible, so as to give a better insight into the problems and prospects of these areas.

CHAPTER-V

PLANNING AND DESIGN GUIDELINES

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PLANNING AND DESIGN GUIDELINES

5.1. VILLAGE PLANNING

5.1.1. PLANNING APPROACH

The foremost consideration in village planning and evolving house designs should that the housing requirements of villagers are met and the effect of planning brings about radical changes in their way of life, which are socially necessary. For sound planning, it is necessary that it is based on knowledge of the villagers, existing socio-economic conditions, and their difficulties with present living standards and estimate their future housing requirements. In this connection the developments taking place in the region also merit consideration. The influence of cities on suburban villages, the extension of transport and facilities, increasing level of agriculture output by means of mechanical farming, by installation of tube wells and above all the influence the electric power and the development activities under the community development program has to be considered and due allowance made for the influence of all these factors on the villagers housing requirements.

While maximum attention has to be given to the planning of individual villages, some thought and consideration must be given to the regional planning, certain community facilities like, schools, markets, clinics, post offices, etc., can not be provided in each village but have to be provided for, on a regional basis. A state should be prepared. This work should be undertaken by on the basis of topography, climate, etc., and regional plans for providing the above mentioned community facilities should be prepared.

5.1.2. PHYSICAL SURVEY

A physical engineering survey of the village should be carried out. The survey should be indicated.

1. Main entrance of the house marked by an arrow.
2. Spot levels of the village
3. The boundary of the village
4. Land available for expansion of the village

5. All trees, wells, tanks, public buildings, approach roads, internal street and other important existing features.

Detailed contoured survey of the area and a key plan showing the village in relation to its surrounding area, existing roads, canals, streams, etc., should also be prepared.

Detailed information about the sources of water supply, its location and if by wells the number of such wells, the population served by each, the distance people have to travel to travel to fetch water(water sapless may also be sent to the nearest public health laboratory for examination to find out its fitness for drinking purposes). Disposal of waste water, disposal of human and cattle excreta and existence of manure pits should also be gathered.

The following information also necessary.

1. Rainfall- annual average and maximum so far experienced.
2. Temperature- Summer:- - Maximum
- Minimum
Winter: - - Maximum
- Minimum
3. Climate: whether humid or arid,
4. Nature of Soil – sandy, alluvial, clayey, black cotton, laetrite, rocky etc.
5. Suitability of local soil for
 - a). Making bricks
 - b). Constructing mud walls.
6. Available local material, such as burnt brick, stones, sand, timber, roofing tiles, thatch, bamboo, limestone, reed, etc.
7. Available of skilled labor, such as masons, carpenters, blacksmiths and their wages.

5.1.3. HOUSING PATTERNS

In rural areas land is generally not scarce and expensive, hence single storied construction is desirable, the house can be in row, semi-detached or detached. Row houses are economical inland use and save on cost of common walls and services like roads, water supply, drainage and electricity, but present difficulties in regard to keep of cattle which have to be housed in such a case, in the front courtyard which is not

recommended from hygienic consideration. Alternatively the provision of back service lanes could provide a possible solution for taking the cattle to the back courtyard. The provision of back lanes also is not desirable as they remain dirty and unhygienic. Row houses should, therefore, be adopted for persons who do not own cattle, such as artisans and non-agricultural laborers.

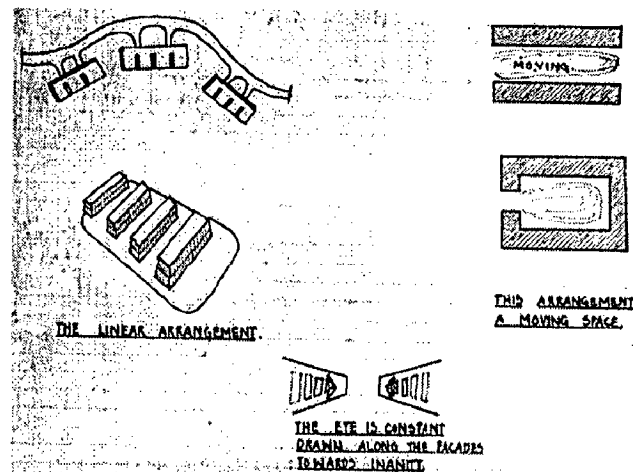


Fig: 5.1. Different Housing Patterns

Detached houses require too much land and are not economical except for the small well-to-do class. Therefore, generally semi detached houses with back to back plots avoiding service lines are suitable for our villages. This arrangement also results in better security for the cattle in the rear courtyard and provides greater scope and flexibility for further expansion.

5.1.4. DENSITY OF VILLAGE HOUSING

In planning a village a gross density of about 25 to 38 houses per hectare should be aimed at. In the village where sufficiently large area of land is available, the architect or planner may be tempted to go in for a thinner density, but the advantages of a sprawling village with larger house plots, wide streets and extensive open areas must be carefully weighed against the disadvantage to longer run of streets, drains and electric lines to be provided for and maintained.

5.1.5. SIZE OF PLOTS

The size and preparation of a house plot is a matter, which should receive the consideration of the planner. The width of the plot for a semi-detached house should be such as would allow for a side passage of sufficient width for the cattle, etc., to the backyard. The depth of the plot should be sufficient as would permit reasonable distance between the cattle shed and the living rooms, besides accommodating cattle shed fodder store and a spacious back courtyard. The back courtyard is an essential adjunct to the house as a great number of activities of life are carried out in the open, under the shade of tree, for many months of the year. For these reasons a depth of 24 to 27m, is considered desirable, though in areas where land is scarce, lesser depth may have to be adopted. For semi-detached house, a plot size of 9m X 24m and for a row type house a plot size of 9m X 18m may be adopted subject to variations depending on the availability of land. Plot size will also be governed by the occupational requirements of the inhabitants.

5.1.6. OPEN SPACES

An amenity, which is often lacking in village, is the availability of open spaces for children to play who are hence obliged to play indurate streets and odd places. For proper physical as well as mental development of children it is very essential to provide adequate open spaces, dispersed in different parts of the village, for their play and games. Open areas are also required for various other common purposes, such as social gatherings, fairs and melas. The village square which is the meeting place for both children and adults should be centrally located and planted with shady trees. It is recommended that about 1- 2 hectares of open space should be provided for a village having 200 houses. The community buildings may be grouped on one side of the open space so that open space could have multiple uses.

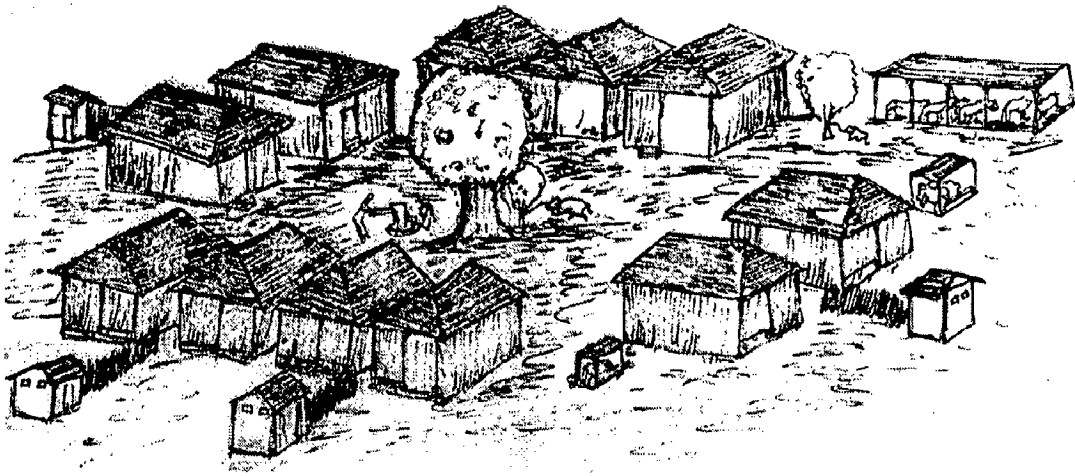


Fig: 5.2. Open space Treatments

Space for manure and compost pits should be provided at the fringe of the village keeping in view the prevalent wind direction so that no offensive smells reach the houses.

5.1.7. PATTERN AND WIDTH OF ROADS AND STREETS

An important aspect of village planning is the pattern and width of roads and streets. The pattern of streets depends upon the topography and other local features while the width of the streets, is determined by consideration of intensity and nature of traffic, space required for services and adequacy of lighting and ventilation for the structures abutting on the streets. Ordinary the plying of bullock carts is the only vehicular traffic expected on most of the village streets. The street width should, therefore be adequate for to loaded a bullock carts to cross each other without any hindrance. Some allowance must also be made for the space that may be taken up on the streets for the running of drains. A minimum width of 4.5m may be allowed for local streets and 9m for streets passing through shopping centers or carrying through traffic to main streets and surrounding village. It should be remembered that too many wide streets inside a village can be a handicap. When it comes to paving, lighting, cleaning and drainage. Adequate provision of open space for parking of bullock carts should also be made, in order that streets may not get obstructed by parked carts.

5.1.8. ROAD WIDTHS SHOULD GENERALLY CONFORM TO THE FOLLOWING STANDARDS

1. Main roads from 12 to 18m wide, the later width to be adopted in those cases in which the road is a through artery between the main village or towns.
2. Main streets at least 9m, wide so as to have two lanes of traffic and side drains.
3. Small streets to be at least 4.5m wide.
4. Blind lanes should not be encouraged.

5.2. PLANNING OF RURAL HOUSES

5.2.1. HOUSE REQUIREMENTS

While in an urban area a one-roomed house has been accepted as the minimum for the time being, in rural areas, due to different conditions, generally a two-roomed house (or a room and a living verandah) should be considered as the minimum. Village economy is based more on 'kind' than on 'each' and therefore the need for space required for storage of articles, such as grain, pulses, oil, cotton, fuel, etc., for household use is much more in village. As such, the area of living space (including verandah) should, generally, be not less than 20sq.m. In addition, there should be a kitchen (verandah or room) a latrine and a back courtyard. For bathing and washing purposes there could be a small paved platform in the back courtyard. If due to economic stringency some village cannot afford a two-roomed house to begin with and only a one-roomed house is provided, there should be provision in the house design for the addition of another room subsequently.

In India generally, the climate in many regions is such, that it is more comfortable and healthy for the people to live and work outside the house in the open or under a tree, for many months during a year. A courtyard, therefore, for this purpose is a very essential adjunct to a village house and its design and layout should receive adequate attention. A courtyard at the back of a house affords greater privacy and is more useful than one in front, particularly from the viewpoint of the needs of

The womenfolk. Wherever possible, however it is desirable to also have a front courtyard, which could be smaller than the one at the back for use by the men-folk.

A part from the space needed for human habitation there should be separate accommodation for cattle, in the form of a shed in the back courtyard, and for storage of fodder, agricultural implements and agricultural produce. Requirement of space for these purposes would vary with individuals. In case of artisans, such as weavers, carpenters, blacksmiths, shoemakers and cobblers, etc.,. Provision for space shall have to be made in the house design to meet the special needs of their trade. Similarly a shopkeeper may also require a shop as part economic standards and vocations have to be studied in detail so as to able to evolve a variety of house designs. As a generally rule, the various house designs should include provision for future expansion. The house should afford shelter as well as privacy. Broadly speaking the village could be classified as under for the purpose of standard type design.

- Farmers with large land holdings
- Farmers with small land holdings
- Artisans with different trade
- Shopkeepers
- Landless labor and the service community

5.2.2. LIGHT AND VENTILATION

There are some aspects, in which a present rural house is particularly defective. It is a common experience that villages do not provide windows of adequate size with the result that rooms are ill ventilated and dark. Even the doors, quite often, are of inadequate height with the result that the inhabitants have to stoop down for going in and out. For a house to be healthy and comfortable, it is essential that doors and windows should be of reasonable size. Minimum clear height of doors should be 1.8m. And minimum area of windows may vary between 8 % and 10 % of the room area depending upon climate. In case of hot and arid regions, where it is necessary to exclude heat and glare from the rooms during the summer, comparatively lesser window area would suffice, while in case of hot humid regions greater window area is needed for comfort. Window in the kitchen should be of adequate size and so placed that there is sufficient light at the cooking place. Incase of storerooms not intended for human habitation, need for lighting and ventilation is generally much less

than that for living rooms. The villagers ordinarily provide inadequate ventilation and lighting on considerations consistent with needs of health and comfort.

Another common defect in a village house at present is the smoky kitchen, because of lack of proper chullah and chimney. Quite often, cooking is done in the living room itself. From considerations of health, it is essential to have a separate place for cooking, with an efficient arrangement for outlet of smoke. Provision of adequate shelf space in the kitchen is also important.

5.2.3. HOUSE DESIGN

A village housing program will not be successful if the types of houses to be recommended to the villagers do not keep in accordance with their customs and traditions. The designer has to be aware of this fact and should be able to combine, in a manner, requirements of housing and health standards.

It is therefore, essential that village housing design should be evolved on sound principles after careful study of the living habits and preferences of the people who will reside in them. For this purpose the tasks of evolving house designs should be preceded by proper investigation so as to obtain an overall picture of the housing conditions, architectural characteristics and living habits of the people. The results of this investigation should be supplemented with the general information obtained from the socio-economic and physical surveys.

It is recommended, especially when designers are not at all familiar with the housing condition in particular village, to conduct a sample survey of a few representative houses. This survey should be made by means of sketches showing:

1. Shape, size and location of plot in relation to entire village, indicating group of houses where the unit under investigation is located.
2. Orientation of the plot
3. Dimensions of various rooms position and size of openings niches, shelves etc.
4. Prevailing position of furniture and other utility articles, etc.
5. Detailed survey of any decorative feature or other features of special interest.
6. Landscaping, courtyard and arrangements inside
7. Position and type of bathrooms and latrines.

Experience has demonstrated that this type of investigation enables the designer to have a better understanding of rural housing, thus making his designs more realistic and adequate.

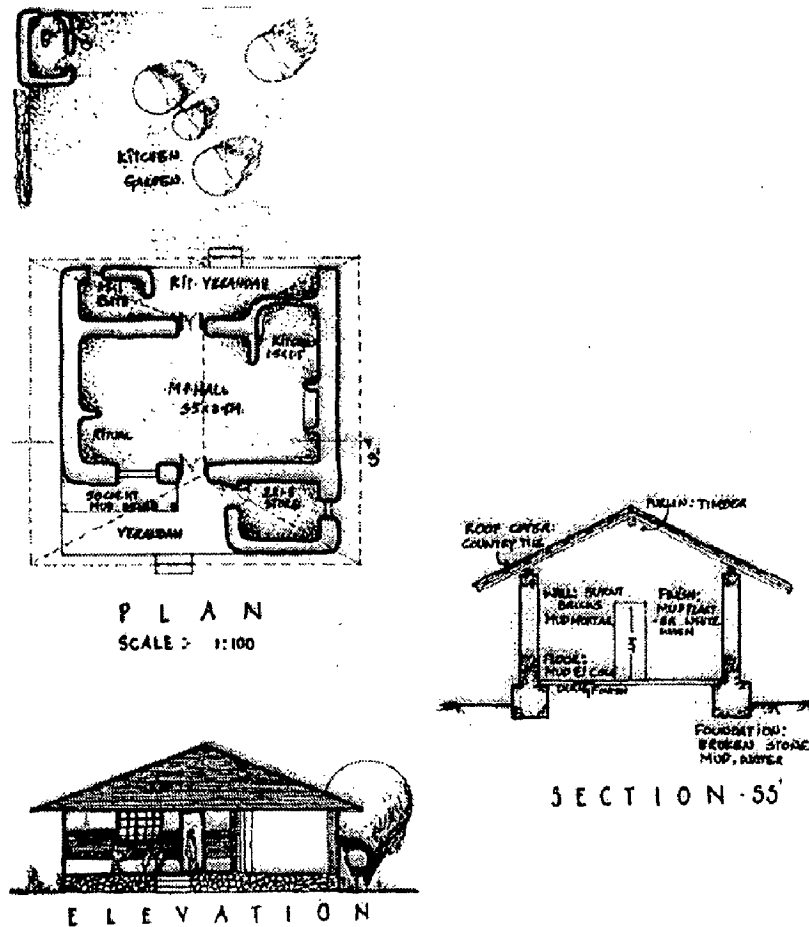


Fig: 5.3. Appropriate House Design

India is a subcontinent with wide variation in climate, rainfall, topography, nature of soil, local resources, social customs and economic conditions etc., house design, construction and planning techniques therefore differ from place to place and it is undesirable to lay down any uniform standards for the country as a whole. However, some broad aspects of planning are discussed below:

1. Architecture of houses should be simple and functional and buildings should harmonize with the rural surroundings.
2. In order to make the houses reasonably comfortable, adequate attention should be paid to climatology and orientation. In hot and arid regions the rooms should be so placed that during summer there is minimum of heat gain through the walls and openings in walls should be restricted. In hot

humid regions, houses should be oriented, with reference to the direction of the prevailing winds and living rooms should be designed to have adequate cross-ventilation.

3. Cattle shed and latrine should be located so as to be the at some distance from the main house; a fair sized courtyard which is an essential adjunct to a rural house should be provided.
4. While providing for reasonable lighting and ventilation to the various parts of the house, the need for restricting the size of windows and ventilators from the point of view of economy and security should not be lost sight of.
5. The construction of houses should normally be such as to have a life of 15 to 20 years.
6. For ease in construction and economy in cost, as far as possible bends, corners and offsets should be avoided and in sloping roof there should not be any valley. With roofing materials and skill generally available in villages it is difficult to make the valley leak proof. For similar reasons house should be designed to have rooms with small spans consistent with other requirements.
7. The house design should provide for future expansion, particularly in case of small houses so that later on when the need of the family increases and means improve, it should be possible for the villager to enlarge his house.

5.3.BUILDING REGULATIONS FOR RURAL AREAS

GENERAL

The unsatisfactory housing conditions prevailing in most of the villages in the country could perhaps be ascribed mainly to the lack of any machinery to regulate house- building activity in the villages. In a number of villages construction work is still going on in an irregular pattern without reference to any layout, standards or plans. Such construction in course of time will nullify the effect of village housing project scheme in the villages. Therefore, there is an urgent need to regulate building activity in rural areas.

However, one thing has to be clearly understood in rural areas, people are mostly illiterate and technical facilities are either totally lacking or available on an

extremely meager scale. Under these circumstances formation of elaborate by laws if no use as they will not be susceptible of implementation. What is needed is to formulate a set of very simple rules and regulations for regulating building activity in the villages.

THE RULES

Every residential building shall provide the following basic requirements:-

1. One living room-cum –bed room
2. A separate kitchen or a kitchen-cum-verandah
3. A verandah
4. A bathing enclosure with pucca floor.
5. Density of houses-25 to 38 per hectare.
6. Road width- 7.5m or more, if possible on new sites and 4.5m or more on existing built-up sites.
7. Size of plot- 140 sq.m(minimum) and minimum width to be 9m
8. Covered area – 50% per plots up to 360sqm. For plots exceeding 360sqm. 50% for the first 360sqm. And 33 ½% for the remaining area.
9. Plinth height:
 - 30cm for the main house generally
 - 45cm for the main house when drainage is very poor.
 - 15cm for Cattle shed.
10. Setbacks- 3m for front, 1.5m for the side for plots up to 160sq.m and 2.4m for plots exceeding 160sq.m.
11. Height of roof- 2.75m clear for flat roofs, 2.25m for sloping roofs at the lowest point.
12. Room sizes:
 - 11sq.m for single room tenements
 - 9sq.m for two room tenements
 - Minimum width- 2.5m.
13. Kitchen size- 4.5sq.m and minimum width 1.8m
14. Bath size- 1.8sq.m.

15. Ventilation area – 8% of floor area. To be increased to 10% in case of humid climates
16. Distance of Cattle shed and latrine from habitable portion- 4.5 to 6m.
17. Latrine- Sanitary type, minimum area 1.1sq.m. And minimum width 90cm.
18. Water supply – Individual wells to be at a distance of 7.5m from a soakage pit.
19. Community wells to be at a distance of 30m from any soakage pit, etc.
20. Disposal of sullage water- to be disposed in to a soakage pit or kitchen garden.
21. Size of door- clear height -1.8m and clear width 75cm.

5.4. APPROPRIATE CONSTRUCTION TECHNOLOGIES FOR RURAL AREAS

The attempt to handle the situation cropped up during the course of realizing that India needed affordable shelters for its various infrastructures. Initially, low unit cost was the objective and ‘low cost technology’ was the way. Unfortunately, this led to disastrous results mainly because; ‘low cost’ became synonymous with ‘low quality’. Very soon, people realized that what rural India needed was buildings with low life cycle, that is low recurrent expenditure, like for maintenance.

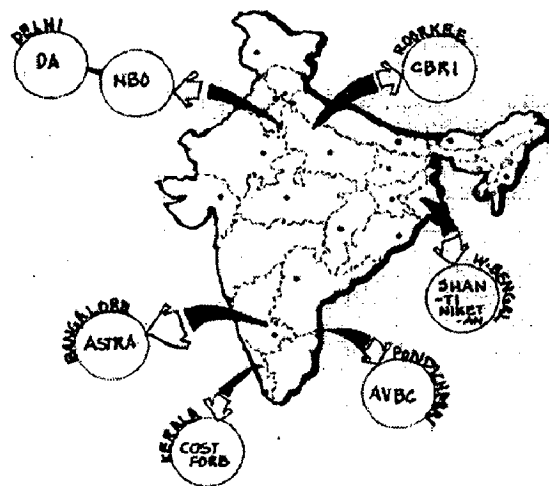


Fig: 5.4. Different Research Institutes in India

Appropriate, alternative and Cost Effective Construction Technologies (CECT's) were the other banners under which many started working. What all these

meant were “sustainable” technologies. Many research institutions like the Central Building Research Institute (CBRI), Structural Engineering Research Center (SERC), many non-government organizations (NGOs) and individuals devoted their minds and hands to address this monumental problem of affordable shelters.

5.4.1. THREE APPROACHES TO THE DEVELOPMENT OF AFFORDABLE SHELTER

GROUP: 1.

It took Cement % Steel Technologies and devoted themselves to explore the means of rational use of these materials. The main emphasis was on the promotion of pre-cast systems both for roofs and walls- for example, RCC plank and joist, RCC and Ferro-cement channel, stone concrete walls and the like.

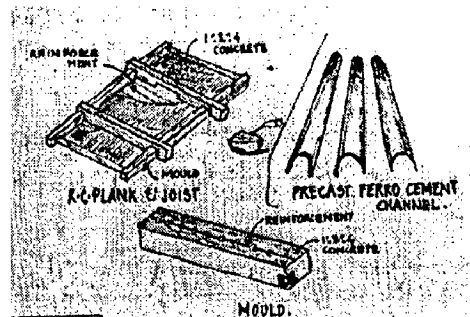


Fig: 5.5. Appropriate Materials

This approach improved the quality of construction significantly and very clear indicated that the factor of safety (or rather, factor of ignorance!) set by the Bureau of Indian Standard for the on-site manufacturing process might be reduced for pre-cast technologies. The CBRI, SERC, National Building Organizations (NBO), many building centers, NGOs and Individuals were instrumental in this movement.

GROUP: 2.

The second group took up more down to earth systems, like rammed earth and stabilized soil blocks. This group was responsive to the fact that the majority of the rural Indian population lived in mud shelters, which had a high recurrent maintenance cost due to the inability of mud to with stand rains. Lime or Cement stabilized mud block walls and compression dominated roofing systems (like vault and jack arch) using the same material was popularized by a good number of institutions across the

country. Traditional rammed earth construction was another important component of this approach, and institutions like Auroville Building Center(AVBC), Pondicherry; Application of Science and Technologies in Rural area(ASTRA), Bangalore; Development Alternatives(DA), New Delhi, etc. were the main proponents. The main achievements of this approach were *low unit cost, better thermal insulation and low consumption of energy.*

GROUP: 3.

The third group went down a middle path. They used filler slab with a pair of clay tiles as filler that reduced self-load of the structure, made the roof thermally superior and economical. RCC ribbed brick slab utilized the tensile strength of RCC and the compressive strength of bricks, thus making efficient use of the material. Brick pyramids and corbelled brick arch provided a greater volume of space and was a good thermal insulator. Rat-trap bonded brick masonry was the other item that was popularized by this group.

5.4.2. FUEL WOOD CONSERVATION

As there is wastage of fuel wood in conventional "CHULHA" due to incomplete combustion on account of inadequate supply of air, the IIT-Delhi has carried out R&D and designed an improved energy efficient wood-burning stove of fixed model Chulha. In addition the improved CHULHA is designed to use the complete flame generated in the Chulha without escaping as in the case of Traditional Chulha and to reduce emission of Carbon-Monoxide, formaldehyde etc.,. Further, the design is contemplated to increase the thermal efficiency.



CHULHA

- The Chulha was developed with one or two post-holes which facilitate the user to cook two items at a time in an efficient way of conserving fire wood.

- The Central Power Research Institute (CPRI) has developed a portable model improved Chulha. The Chulha is made with “cast iron” and “iron sheet with aluminium lining” inside the Chulha. The main advantage out of this model Chulha is that it can be used inside and outside the house. The Efficiency of the Chulha is about 25% - 30%.
- Improved Chulha helps in protecting rural women folk from “Health hazards” and Provides “Pollution-free” environment.

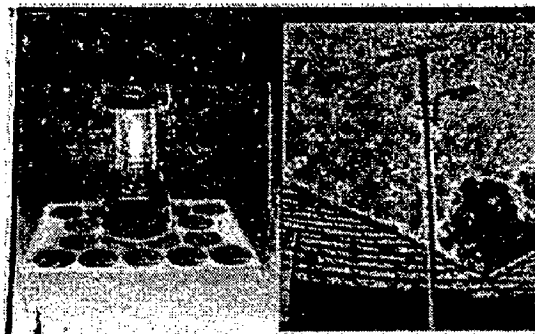
Potential: - The Potential users of these improved Chulhas are those who do not process cattle and mainly depend on “Fire wood” for cooking purpose.

Incentives: - The MNES, Govt. of India has extended the following Incentives as Subsidy:

- Fixed model Chulha (with chimney)- Rs. 40/-
- Portable Chulha (CPRI type-1)----- Rs.50/-.

5.4.3. SOLAR ENERGY

Energy from Sun represents a Potentiality enormous source for a variety of end-uses. More recent applications of these Resources (viz. Solar thermal & Photovoltaic Technology) have expanded the Potential use enormously.



SOLAR LANTERN AND SOLAR STREET LIGHT SYSTEM

Solar Energy has Immense Potential in Andhra Pradesh. An equivalent of about 180 trillion KW of Solar Radiation strikes the Earth. The Earth share of Solar Radiations is only 200 Millionth of Sun’s total Energy. Most parts of Andhra Pradesh have a potential ranging from 5KWhr per Sq.m. per day to 7KWhr per a Day.

5.5. Guidelines for village Design

1. Purpose of Design Guidelines
2. Design Principles
3. Village Character
4. Village Settlement Patterns
5. Creating Village Neighborhoods
6. Village Edge
7. Public Open Spaces
8. Village links
9. Housing Design and Layout
10. Individual House Designs
11. Infrastructure and Services

1. PURPOSE OF DESIGN GUIDELINES

The purpose of these guidelines is not to achieve planning aims by dictate, but rather to create an awareness of the sensitivity of the rural landscape and to demonstrate good house design principles. The design principles hinge upon a few simple rules, allowing ample scope for variation and self-determination. Designs can make clear reference to the rural vernacular without being retrospective, even where non-traditional elements such as conservatories are incorporated. The guidelines illustrate how planned village expansion can be of a scale and extent appropriate for the character of each village.

The guidelines will apply to those areas that are contained within the village boundaries as set out. The detrimental impact of inappropriate urban style dwellings on the aesthetic character of rural villages bears testimony to the inherent need for professional expertise.

2. DESIGN PRINCIPLES

The application of good design principles in new developments provides an opportunity to enhance and protect the distinctive character of each village.

3. VILLAGE CHARACTER

The distinctive character of each village and surrounding countryside should be acknowledged in the design of any new village development. Village character is derived from the interaction of physical features and human activities such as land-use patterns, settlement forms, and building designs. Thus, the visual character of a village should be assessed and new developments should be well related in pattern, scale and location to existing development. Distinctive features such as church spires, views into the surrounding countryside or simply a group of trees, lend to the unique character of a village. New developments should not mask these special features; instead they should be incorporated as integral elements of the village character. Older buildings such as forges, mill buildings and farm structures may provide a link to the past.

Redevelopment or reuse of these buildings serves to retain the historic fabric of the village and may provide valuable community or employment facilities.

4. VILLAGE SETTLEMENT PATTERNS

Scattered and random linear developments are the most common form of housing in rural areas, which consequently result in weak settlement structure and housing forms which are neither suited to town, village or rural areas. Village expansion should provide focused development which creates clear identifiable village boundaries. Developments which are grouped rather than scattered preserve the rural landscape provide visual coherence and create a village rather urban character. The traditional grouping of buildings in farmyards and clachan settlements provides a useful model for successful siting of buildings within the countryside.

5. CREATING VILLAGE NEIGHBOURHOODS

Housing provision should reflect the socioeconomic and demographic profiles of the Village. New Residential Development shall provide a social mix by including a range of house types and sizes. Village housing schemes shall also consider the community needs of the village in terms of the requirement for a shop, a playground

or playing pitch, or other community facilities. Proposal for housing and mixed-use development must enhance the community life of the village.

6. VILLAGE EDGE

Boundary treatment is a critical factor in village expansion given that new residential Developments generally occur at the perimeter of the existing village core. The outskirts of a village are important as they act as gateways to the village and distinguish the village from the surrounding countryside. Thus, significant attention to design criteria is essential to protect and enhance the external view of the village.

Landscape design criteria should form a key aspect in the layout, form and urban design qualities of all new developments, but particularly those which form the village boundary. Do not form a stark edge to the village, or spoil the outside view by neglecting the backs of gardens or buildings. Shelter and contain the village edge using appropriate native broadleaf species.

7. PUBLIC OPEN SPACES

Public open spaces are integral to the enjoyment of village life. The provision of both active and passive recreational open space can significantly enhance village life and aesthetics. A village green may become a focus for community events or simply an informal meeting place, whilst other areas may be suitable for the provision of leisure facilities within the village. Even small spaces which may be limited in function can play a positive role in the village landscape.

New developments coupled with local initiatives can contribute positively to the extent and variety of open spaces in the village core. Within the framework of the relevant Action Plans, new developments can be designed to achieve the following;

- Provide well-planned playgrounds, sports grounds and passive open spaces
- Create linear transitional spaces within or on the edge of the village
- Allow for informal recreational or meeting spaces
- Play areas shall be designed to be overlooked by housing

8. VILLAGE LINKS

New development must be accompanied by the provision of roads, footpaths or cycle ways to build up a network of routes between homes, schools, shops and playing fields. Village expansion presents an opportunity for the improvement of pedestrian and cyclist circulation. Currently; there are few linking routes for pedestrians and cyclists throughout the villages, whilst direct access into the countryside by laneways and footpaths is extremely limited. Additional village developments should seek to improve such circulation by careful design considerations.

9. HOUSING: DESIGN & LAYOUT

Modern houses are generally larger than the vernacular buildings of the past, however, scale can be handled carefully to produce a building which 'fits' the village townscape.

Successful design involves:

- An assessment of neighboring properties and the prevailing character of the village
- Opportunity for village enhancement
- Development adjacent main roads or village centre should provide new or improved streetscape
- Buildings can be grouped to create pleasant informal spaces, whilst a variety in building types can bring a scene to life.
- Subtle variations in building designs allow a several houses to read as a distinct cluster
- Traditional village character that can be interpreted in contemporary design.
- Peripheral dwellings should face outwards across a road, particularly on prominent sites.
- Landscape treatment should integrate new development within the surrounding environment whilst incorporating the existing vistas and visual links with the countryside.
- New residential development should not break the skyline as seen from outside the village.

- Attractive ‘gaps’ which provide visual access to the countryside should be maintained.
- Vistas into and within newly developed areas can be created.

10. INDIVIDUAL HOUSE DESIGNS

The building materials selected for a new dwelling should display recognition of the materials which are prevalent in the locality. In this respect, the widespread use of plastered or rendered walls offers the strongest guideline. Building colour is a personal choice, however, it is advisable to observe and conform to the colours used on locally painted houses. Thus, in areas where white predominates, this or a very light coloured variation would be the most ideal colour choice. Alternatively, where stonework is prevalent a stone-coloured paint is more desirable to help the building blend with the natural colours of the landscape. The use of stonework in such areas are preferable, although cost factors may prove prohibitive. Brickwork and artificial stone are rarely successful in the rural environment and should be avoided. Similarly, features of brick and stonework cladding rarely yield a satisfactory appearance. The simultaneous use of several materials creates visual confusion and detracts from the building form. Thus, materials such as stone and brick should never be mixed and feature elements in different materials should be avoided. Buildings simplest in form and materials offer the greatest potential for eventual landscape integration. The gable of a house should appear solid and not have too many window openings which in effect weaken the structure visually.

11. INFRASTRUCTURE AND SERVICES

Many of the villages in the country do not have adequate sewerage treatment or surface water treatment, and the extensive number of villages in the country will require significant investment to provide such services. Therefore, the expansion of villages will depend on greater partnership with the private sector. In order to encourage village housing, the council will allow the construction of proprietary wastewater treatment systems.

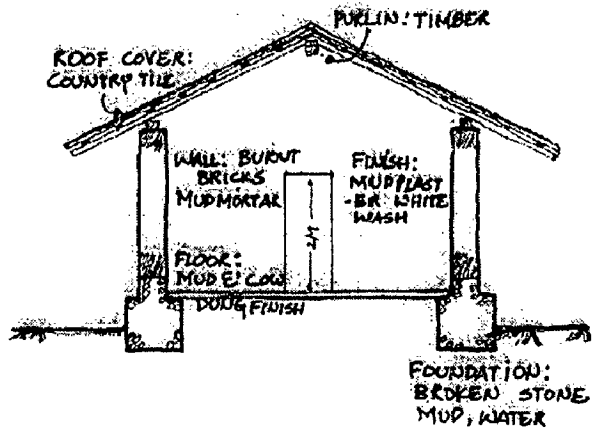


Fig: 5.6. Section to Representing Materials

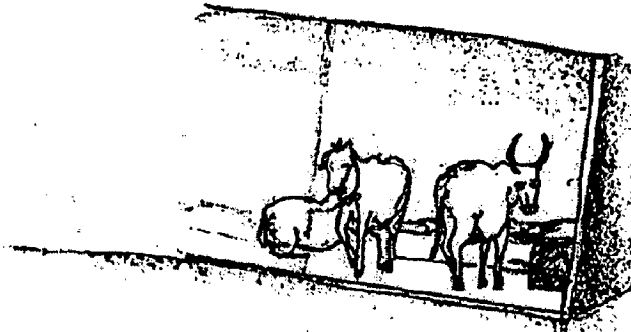


Fig: 5.7. Cattle Sheds are kept Far away from the Living Spaces



Fig: 5.8. Storage Space for Food Grains near the Entrance.

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